CALIFORNIA HIGHWAYS and PUBLIC WORKS

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Table of Contents

Investigating the Water Resources of Southern California Counties

THE Water Resources Investigation now in progress throughout California constitutes the most extensive water survey and study ever attempted in the United States. Southern California water studies constitute a major part of this important investigation.

The area south of the Tehachapi contains over half the population and one-fifth of the agricultural lands in the state, but only one per cent of the total water supply (exclusive of the Colorado). The value of water in the cities and highly developed citrus lands of the south is much greater than in other parts of Califorina and has made it possible to pump from wells with lifts as great as 400 or even 600 feet. Nearly all of the natural water supplies in southern California have been used up and there is an immediate and pressing necessity for more water which can only be secured from the Colorado. However, there still remains in some streams water which has not yet been put to use.

On account of the extreme scarcity and great value of water in the south a large amount of enginering investigation has been carried on by the state and local interests for many years. However, accurate and continuous measurements of stream flow, water supply from rainfall, waste into the ocean, have not been available, the reason being that the physical conditions make such accurate measurements extremely difficult and expensive to obtain.

PROBLEMS PECULIAR TO SOUTH

Geological and topographical conditions in southern California are different from those in the north. The stream flows are very erratic, and large and destructive floods occur, followed by seasons of almost no run-off. The stream channels in the mountains are very steep, which results in there being few reservoir sites of value. On the other hand, the great floods flowing down the steep channels have carried out tremendous quantities of gravel and sand and have built up porous detrital cones which afford underground storage reservoirs. The existence of these underground reservoirs has made possible the agricultural developments of southern California, which would have been limited otherwise. For instance, in the Santa Ana Basin the usable underground storage capacity is estimated at a million and a half acre-feet, which is about twenty times as great as the surface storage now in use on this stream. These same conditions obtain generally in southern California with the exception of San Diego County, where there are no underground reservoirs of consequence, but where as in the northern part of the state advantageous surface reservoir sites do exist.

STREAM GAGING OF VITAL IMPORTANCE

These different physical conditions widely change the character of the water resources investigation in southern California from that in the area north of the Tehachapi. As more accurate knowledge of the stream flows is basic information necessary for proper engineering analysis, an intensive stream gaging program, in addition to that which has heretofore been carried on by the federal and state governments was planned and is now in operation as follows:

Santa Maria Valley (Santa Barbara County): Stations have been established on Huasna Creek at mouth; Cuyama River above Huasna Creek; and on the Sisquoc River at its debouchure into valley.

Santa Ynez River (Santa Barbara County): Discharge will be calculated from records at Gibraltar Reservoir of the city of Santa Barbara.

Ventura County: Stations on Santa Clara River, Sespe and Santa Paula creeks, and Ventura River.

Little Rock Creek (Los Angeles County): Data will be secured at the reservoir of the Little Rock-Palmdale Irrigation District for calculation of stream discharge.

San Gabriel (Los Angeles County): A total of 27 stations have been in operation for several years past by the state.

Santa Ana (Orange, Riverside and San Bernardino counties): A total of 58 stations in the watershed.

Mojave River (San Bernardino County): Stations established at the mouths of Deep Creek and West Fork above irrigation and also at Afton below all irrigation.

San Jacinto River (Riverside County): One station near San Jacinto.

Whitewater River (Riverside County): Station at highway crossing at debouchure, and also below Indio. Also a station on Palm Canyon, a tributary of Whitewater River.

San Juan Creek (Orange County): Station at ocean.

Santa Margarita River (Riverside and San Diego

This article constitutes a report made by B. B. Meek, Director of the Department of Public Works, to Governor C. C. Young at the January session of the Governor's Council.

counties): At Nigger Canyon reservoir site and at Temecula Canyon near Fallbrook.

San Luis Rey River (San Diego County): At the mouth and also at Bonsall about 15 miles upstream.

San Dieguito River (San Diego County): Discharge will be calculated from Lake Hodges reservoir records.

Tia Juana River tributaries are to be measured at international boundary as follows: Campo, Tecate and Cottonwood creeks.

SANTA ANA RIVER INVESTIGATIONS IN ORANGE, RIVERSIDE AND SAN BERNARDINO COUNTIES

An intensive investigation along several lines is being made in the Santa Ana River Basin. Conservation in the Upper Santa Ana Basin can be best accomplished by "spreading," which consists of diverting the flood waters, which would otherwise flow to the ocean unused, onto the gravel cones extending into the valley and sinking this flood water into the underground reservoir, from which it is later drawn by pumps. Much work along this line has already been done by the Tri-Counties Water Conservation Association, but it is planned to increase the facilities for spreading by means of a permanent weir or dam across the mouth of the canyon and larger spreading works. The state is making a detailed survey of the Santa Ana Cone, and the topographical survey of possible diversion works at the mouth of the canyon is almost completed. This is to be used as a basis for preliminary plans for diversion works which will function during high water periods and allow the diversion during floods of 1000 second-feet for spreading which will cause it to percolate into the cone on the north side of Santa Ana River. Diversions of this magnitude under conditions of violent floods found in southern California rivers are unprecedented and the problem presents many new and extremely difficult features.

AERIAL SURVEYS; OTHER STUDIES

Arrangements have been made for an aerial survey of the entire area in the Cucamonga Plain from San Antonio Creek eastward to Day Creek and from the mountains southward to Foothill Boulevard in the western part of the area and to Base Line road in the eastern part of the area. This will cover the cones of all the streams of any magnitude issuing from San Gabriel Mountains onto the Cucamonga Plain and will provide a basis whereby systematic plans for spreading these waters on the cones can be worked out and also will provide a basis for plan for a channel to carry the surplus waters of extremely excessive floods safely to the Santa Ana River. Recent studies made by the state have indicated that there is a very material accretion to the groundwater supplies from rainfall on the valley floor itself and from return water from irrigation. Also, there is a considerable loss from evaporation from swamps and waterlogged land. In addition to the stream gaging program mentioned, a comprehensive study is being made of rainfall percolation, evaporation from waterlogged lands and allied subjects. This work is being done in conjunction with the United States Geological Survey and Department of Agriculture; also with the three counties.

MOJAVE RIVER, SAN BERNARDINO COUNTY

A program for a thorough investigation of the Mojave River Basin has been laid out, consisting of stream gaging, measurements of depth to water plane at wells, together with mapping of irrigated and other areas more or less swampy which are dissipating water. The results of this investigation will show what further agricultural development can be made with the water supplies available in the Mojave River.

An aerial survey of the entire valley has been completed which will yield the needed information as to extent of irrigated lands and also areas dissipating water through evaporation. A close estimate showed that this work could be performed more cheaply by aerial survey and a great deal more quickly than by other standard surveying methods.

VENTURA COUNTY

An intensive water resources investigation is being made of the watersheds of Ventura River, Santa Clara River and Calleguas and Conejo creeks, lying southward in the Oxnard section of Ventura County. In short it is an investigation of the entire water resources of Ventura County, looking toward plans for as complete conservation by surface and underground reservoirs as is possible to make together with the determination of the areas in which the water can be best used. Work under way during the month consisted of measuring percolation, determining capacity of underground reservoirs and assembling and analyzing data gathered in the field. Ventura County cooperates in this work.

GENERAL

A general underground water investigation of the entire Pacific slope of southern California is nearly completed. Well records over several years on 968 wells have been obtained by the state itself or furnished from other sources, and all these data are being compiled into a report, which together with maps will be published at an early date.

Battling Snow on State Highways

By T. H. DENNIS, Maintenance Engineer.

THE blanket of snow which covered California's recreational roads, and a portion of the mainline routes, while of immense benefit to the agriculturist and untold delight for the enjoyment of winter sports, presented a real task to the maintenance organization of the State Division of Highways. Most of the maintenance crews in this region were on duty day and night for the entire week ending January 11th. While the average Californian has been enjoying the warmth of his fireside, these men have been out all day and night, battling the icy blasts and snows of winter that the roads might be kept open.

On the Redwood Highway snow fell as far as Eureka to a depth of 6 inches, while on Oregon Mountain east of Patrick's Creek there was a fall of 3 feet. However, travel at all times was able to use this route.

On the Pacific Highway the ground was covered with snow from Orland to the Oregon line, ranging from 20 inches at Redding to some 4 feet near Castella. Rotary and push plows were operated continuously during the period of the storm and a two-way road maintained at all times.

On the Trinity Lateral, between Redding and Arcata, snow was removed from the entire lateral, the snow ranging from 2 feet to 3 feet in depth.

On the Alturas Lateral men labored continuously with truck plows, tractor plows, and graders in removing snow. The snow extended from Redding to the state line, a distance of 180 miles, the depth ranging from 2 to 4½ feet.

On the Red Bluff-Susanville Lateral the snow extended from Red Bluff to the state line, a distance of 179 miles, and some eight crews, equipped with rotary and push plows, disregarding time entirely were able to keep the road open at all times. The maximum fall was at Fredonia Summit, where a fall of approximately 3½ feet occurred.

Snow was also plowed on the Klamath River Lateral from the mouth of the Shasta to Weitchpec, a distance of 132 miles.

The foothill country east of Sacramento was entirely covered with snow, the snow extending down into the valley. However, all of these foothill roads, including the Mother Lode, were, by continuous effort, maintained at all times open to travel. By reason of these efforts, people were enabled to enjoy snow sports at various points.

Snow was removed on the Tahoe Road as far east as Riverton, 20 miles above Placerville.

On the Auburn road snow was removed from Auburn to a point 21 miles above Colfax, the government airport, which is at an elevation of some 5200 feet. Tractor, push and rotary plows were necessary to provide a continuous two-way opening of this route, the maximum depth of which was 10 inches at Auburn and 4 feet at airport.

Snow fell as far down as Auburn on the Downieville Lateral, and the strenuous efforts of the highway crew enabled this route to be kept open to Nevada City at all times, and succeeded in opening to Downieville within a week after the peak of the storm. The heaviest fall of snow occurred at the 3500-foot elevation, east of Camptonville, where a fall of 4 feet was removed.

The interstate traffic between the state line and Truckee was uninterrupted, even though the fall averaged in excess of 24 inches between these points, tractor plows and truck plows being operated continuously by our crews. Truck plows, by continuous operation during the past week, were enabled to clear the snow between Sonora and Long

MAINTENANCE FORCES OFFICIALLY COMMENDED

The work of maintenance forces in battling snow on state highways was recognized in the following vote of the California Highway Commission.

Voted, That the California Highway Commission expresses appreciation of the untiring and able manner with which maintenance forces of the Division of Highways battled with snow on state highways during the storms terminating January 11, 1930.

The Commission feels that the record is one in which the entire people of California can well take pride and is an example of the unselfish devotion to duty which permeates the entire state highway organization.

Motor grader on Victory Highway.

Barn, a distance of some 20 miles, the average depth exceeding 24 inches of snow, with a maximum of 3 feet at Long Barn.

By strenuous efforts and continuous operation a rotary snow plow maintained a two-way road between Murphy's and the Big Trees, where the winter sports were enjoyed by thousands of people over the week end. Traffic on this route was not interrupted at any time.

Truck plows and tractor plows performed their share in the work of keeping the All-Year Highway open into the Yosemite. Some trouble was experienced on January 12th, between 6 a.m. and 10 a.m., due to a 15-inch fall on the Briceburg Hill, but this, too, was

Scene on State Highway during January snow storm.

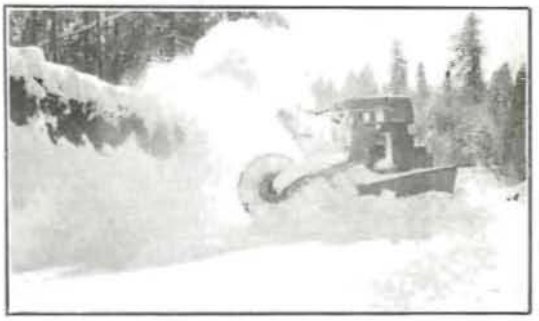
removed, and travel allowed to complete their journey from the park.

In the southern portion of the state some 70 miles of the Ridge road was blanketed with a cover from one to three feet deep. Some 12 pieces of equipment operated over this stretch, consisting of truck and tractor plows, which later were supplemented with a rotary.

Two-way and one-way travel was allowed over this route, with the exception of the period between Saturday at 9 a.m. and Sunday at 3 p.m. Considerable trouble was experienced on this route, due to the heavy trucks which attempted the grade without being provided with chains. The storm also caught many of the motorists unprepared, and they were restrained from attempting the trip not being provided with chains.

On the Arrowhead Highway leading eastward across the Desert to the state line some 4 feet of snow fell at Cajon Pass. Some 6 pieces of equipment labored continuously during this period, supplemented by men with shovels, to maintain a continuous one-way road throughout this storm.

Between Beaumont and Banning, at the Desert's edge, east of Redlands, the pavement was covered with some two feet of snow.



Snow plow at work on State Highway in Calaveras County.

However, this at no time interfered with traffic.

East of San Diego on the Border Highway, falls of snow were had near Pine Valley, Buckman Springs, and Boulevard, yet by the efforts of our crews this route was kept open.

All in all, the weatherman has provided an

(Continued on page 25.)

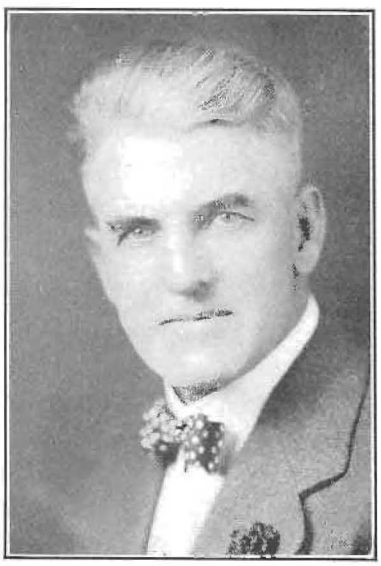
View of snow conditions on Ridge Route on January 12.

Night Patrol Being Organized

By Roy Youngblood, Assistant Superintendent, California Highway Patrol.

IF THE scream of a siren on a powerful white car disturbs your reveries along a quiet road some night soon, don't get excited over it. Pull over to the side of the highway and let the white car pass for it probably will be only the night patrol chasing another drunken driver or speeder.

It may be some weeks before that happens. It takes time to organize a night patrol



Roy Youngblood.

just as it has taken time to get the regular patrol in working order. But happen it will for California highways are going to be protected against the reckless and criminal driver by night as well as by day.

Section 30-1 of the motor vehicle act states that "the chief of the division (meaning the Division of Motor Vehicles) shall make adequate provision for the patrol of the highways both day and night."

The executives of the California Highway Patrol regard this as a mandate of the legislature as, indeed, it was intended to be when put into the act, and have taken steps to organize patrol to the end that a part of every county unit shall be on night patrol duty all the time.

Some weeks ago, requests were sent to the supervisors of forty-five counties asking that they submit lists of candidates from which additional appointments to the regular force could be made, in compliance with the law. In all, 122 additional men were requested it being contemplated to use this number of men at the beginning for night duty.

Although the average number of men requested in each county was two, some counties will need as high as four.

To date practically all the supervisors have responded and have submitted their lists. It now remains for these appointments to be made after the manner set up by civil service regulations.

After the men have been appointed a considerable period of training will be necessary before they will be permitted to go out on night patrol duty. This type of work is very different from day patrol duty and will require a special type of training.

We also have taken steps to provide the men with inexpensive but substantial automobiles. Motorcycles will not be used to any extent for night duty because of the hazard of operating them at night.

The additional men appointed are to be assigned to the captain of the county from which they were nominated. Whether assignments for permanent duty to the night patrol will be made or whether it will be arranged in shifts so that all members of every squad are assigned to it a portion of each month remains to be worked out.

Both arrangements have their advantages. In nearly every squad there are, unquestionably, men who would prefer night duty the year round and the privilege of using an automobile to day duty on a motorcycle. Indeed, there are some of our men unable to ride a motorcycle because of injuries received in the service. To such the night patrol will be a godsend.

As contemplated at this time, the night patrolmen in each county will work under instructions from their county captains. However, we are working on plans for providing some sort of central supervision for these men inasmuch as it obviously is impossible to expect the regular captain to work day and night or to have a day captain and a night captain in all the counties.

It may be possible to work out this problem

with the district inspectors in some way to provide night supervision.

The men will work in pairs, never alone. Experience has taught us this is the safest plan. On night patrol the officers are likely to encounter the most hardened type of criminals who would not hesitate even at murder to carry out their evil intentions. Sawed-off shotguns and possibly tear bombs will be a part of the equipment of every car operated at night. The patrol must be prepared for every emergency.

While the men will be instructed to enforce every part of the Motor Vehicle Act and to arrest persons violating any of its provisions, we intend to give them specific training along certain lines to catch the type of offender operating at night.

Most important, perhaps, is the crying need for abatement of the headlight evil. We have conducted statewide raids at various times against glaring lights but this gives us only temporary relief. The night patrol will be instructed to pay particular attention to this type of offender.

Traffic counts made all over the state have developed the fact that the highways are used at night by large numbers of trucks engaged in commercial transportation.

Night patrolmen will be instructed to keep an eye out for the overloaded truck. And, of course, special training in the technical aspects of the law governing overloading will be needed before the officer can be sure when he is right and when he is wrong.

The schools for the officers we are arranging to establish will solve the problem of fitting the men for the special task of night patrol work. General J. J. Borree, head of the schools and education bureau, has just returned from the east where he was sent to make a special study of traffic officers' training schools. The information he secured will be turned to good account in the special training.

As stated before, it is our hope that the night patrol will serve in a large measure to reduce the toll of death and injury on the highways. While the volume of accidents occur in the late afternoon when traffic is at its peak, the accidents involving the greatest number of fatalities occur at night. The drunken driver is a heavy contributor to this toll and we are going to make a special effort to get him. In general we have found that cars involved in accidents at night are cars traveling at excessive rates of speed. Naturally when an accident occurs under such conditions it means a bad smashup and a death.

Governor Inducts Highway Patrol Into New Duties

The California Highway Patrol was officially inaugurated in ceremonies held in Los Angeles January 29th and at Sacramento February 4th at which Governor C. C. Young reviewed members of the patrol of the southern and northern counties.

The Los Angeles ceremonies were held on the north side of the Coliseum grounds. Approximately 100 officers in their new two-tone uniforms and equipped with new white motorcycles were drawn up for review. Governor Young passed along the line shaking hands with each man. Accompanying him were Bert B. Meek, Director of Public Works, Eugene W. Biscailuz, superintendent of the patrol, Mayor Porter of Los Angeles, Sheriff Traeger, Chief of Police Steckel and others.

Governor Young made a short address, congratulating the men on their appearance. He declared the primary object of the patrol was not to make arrests but to protect the motorists on the highways and to assist traffic.

More than a score of photographers and talking picture cameramen were on hand to record the ceremonies.

A spectacular parade preceded the ceremonies.

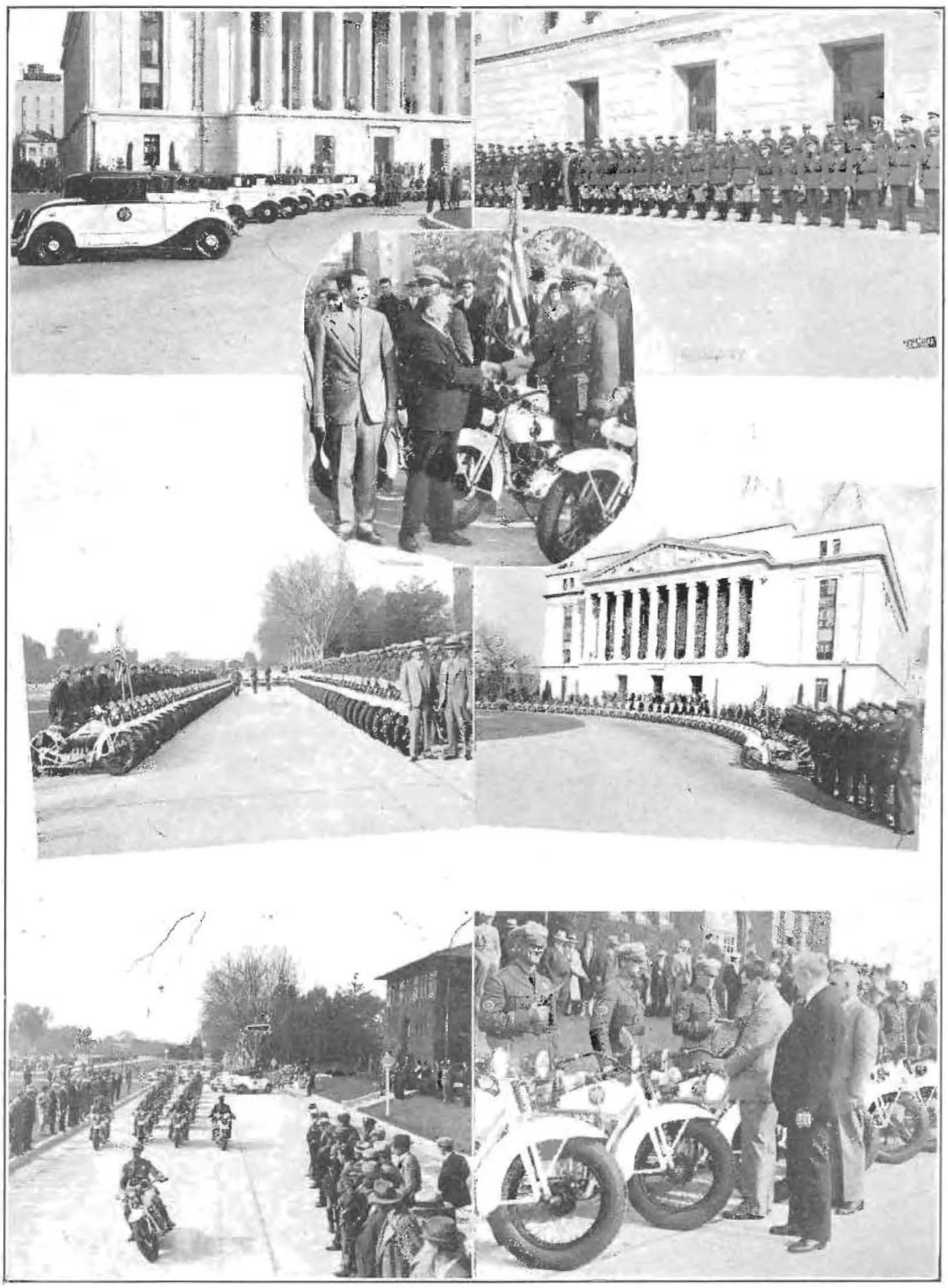
The scene was reenacted in Sacramento on February 4th when approximately 50 officers and executives lined up for review in the square between the two Capitol extension buildings.

Governor Young expressed the hope at the Sacramento ceremony that the inauguration of the new patrol would do much to reduce the toll of accidents on the highways. Biscailuz pledged the efforts of himself and the patrol in making this possible.

VIEWS ON OPPOSITE PAGE

Upper pictures—Motor cars and traffic officers on inspection in Sacramento; Governor C. C. Young extending congratulations to Ed Schmidt; B. B. Meek, Director of the Department of Public Works at left of Governor Young; Left center—Southern traffic officers on review in Los Angeles with Eugene W. Biscailuz, Superintendent of the California Highway Patrol, and Roy R. Youngblood, Assistant Superintendent, standing in front of the line to the right; northern traffic officers on inspection before the State Office Building in Sacramento; the two lower pictures show southern traffic officers on parade in Los Angeles, with Governor Young, Superintendent Biscailuz and Assistant Superintendent Youngblood inspecting the squad.

Hail the New State Highway Patrol!



State Safeguards its Construction By Thorough Supervision in Field

By J. W. DUTTON, General Superintendent, Division of Architecture.

THE evolution of a construction project is very often quite interesting. The man with the money finds himself in need of a building. He looks about for his architect and when he finds one to his liking, he lays his desires before him, giving him all the information he can think of, how much he expects to spend, what sort of a building he

J. W. DUTTON.

wants, the type of architecture he favors, and the type of construction he thinks is best for the use he proposes to give it. The architect then proceeds to design the building and after various degrees of modification or elaboration he is successful in selling the owner a design which it is shown by the estimate can be built within the funds available.

This being settled upon and approved, the architect gets out complete working drawings and specifications and the job is put out for bids and finally a contract is let for its construction.

Then follows usually the selection of a satisfactory superintendent of construction to represent the architect and owner and the work goes merrily forward. Unless otherwise agreed upon, the responsibility of the architect continues throughout the entire progress of the work and on to its satisfactory completion.

STATE PROCEDURE SIMILAR

With the State Department of Public Works, Division of Architecutre, the general scheme is very much the same. Instead, however, of the business being arranged by a private owner and a private architect, it is done on the one side by the State Architect and his designing force and estimators, and on the other side by the executive head of the institution, under the guidance and direction of the head of the department under which the particular institution comes, such as the Department of Institutions, Department of Education, or the State Board of Prison Directors.

In many cases, due to the similarity of requirements and the general trend toward standardization of buildings for similar purposes throughout the typical institutions, and the accurate cost data which are kept on all of the construction carried on by the Division of Architecture, and the familiarity of all parties concerned with the latest approved plan layouts, etc., the preliminary arrangements can be decided upon without undue loss of time. However, occasionally a project comes up calling for design of a building for some exceptionally special function on which the division has no first-hand information available. Considerable research is obviously then required in order that no detail neces-

The new cell block at Folsom.

sary to the successful and practical use of the building is omitted.

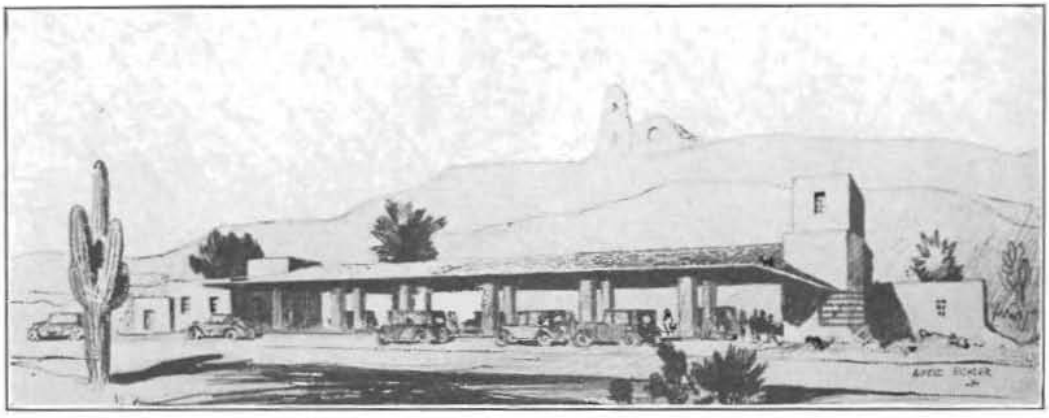
FROM OFFICE TO THE FIELD

Very naturally, when a set of finished drawings is gotten out for a job, comprising complete architectural and engineering drawings and details, including mechanical and electrical layouts and details, and the specification writer has completed his work, the office force, particularly those in charge of the various sections, is pretty thoroughly familiar with the project.

The job then goes out for bids and contract. It is then that the field force gets its first look at what has taken months possibly to devise. Within a few short weeks at most, the job is started and the field superintendent

construction by the field force. On account of the often remote locality of the work there is difficulty in obtaining a detailed explanation of the scheme from the designer and it is possible that the job superintendent does not grasp the entire import of the matter and later finds that adequate provision has not been made in earlier work to make the best installation possible.

It is fully realized that there must be a limit to what is shown and detailed in a set of drawings and called for in the specifications and a lot must be left to the intelligence and experience of the field superintendent but it is a wonderful help to him and an invaluable guide against error if his attention is called to the exceptional by a brief note on the drawing.



Plant quarantine inspection station being planned by the Division of Architecture for the Department of Agriculture.

is expected to have acquired a pretty thorough knowledge of what is on those plans and in the specifications and be able to protect the state against errors or omissions such as are so easily possible during the progres of a job.

Thus, attached to the field force of any construction organization, there is a degree of importance and responsibility which is not always fully realized or appreciated.

In some minor cases, where the work is regular in character, the field superintendent needs no particular assistance from the office in addition to the plans and specification in order to carry out the job as called for, but in the case of major construction, there are peculiarities of requirement and design attached to practically every project turned out that call for unusual application of known principles and methods of construction. Quite often the actual success of the detail from the builder's standpoint, calls for further study and preparation or arrangement of earlier

DRAWINGS ARE EXPLICIT

It is conceded by contractors generally that there is very little to guess at on drawings gotten out by the Division of Architecture and it is not often that a difference of interpretation arises between the superintendent and contractor. This happy situation can only be brought about and maintained by advance knowledge and conclusion as to what is called for, and proper directions given before errors are made.

Where a field superintendent is already on the ground, in connection with other work, he is supplied with drawings and specifications of the forthcoming new project as early as possible before the contractor arrives to start the work. The field superintendent is instructed to apply any spare time he may have to a detailed study of these drawings and to make notes of any and all points on which he is not fully clear so that these may be explained to him in ample time. After the con-

(Continued on page 26.)

Machine Finishing for Hot-Mixed Highway Pavement in California

By C. S. Pope, Chief Construction Engineer, California Division of Highways.*

THIS paper relates to the use of mechanical means for spreading, raking, and finishing hot asphaltic mixture for highway and street paving.

The information presented herewith was obtained over a working period of about three years, during the construction of some 250 miles of asphaltic concrete surfaced highways and thousands of square yards of city streets.

The purpose of this paper is not to provide a comparison between the asphaltic type of pavement and any other type, but rather to describe an important advance in improved structure in the asphaltic type and a more economical construction which has been made possible by the introduction of machine finish.

CONCLUSIONS

The advantages which have become apparent and the improvement in asphaltic construction which have followed upon the introduction of mechanical spreading and finishing have been summarized as follows:

(1) Removal of limitations on plant capacity, due to former inability to handle large tonnages on narrow highways.

(2) Decrease in unit costs of asphaltic mixture, due to quantity production and quantity handling on the street.

(3) Greater uniformity of structure of the asphaltic paving base and surface.

(4) Decrease in surface roughness to a point where there is now little difference between the best laid asphaltic type and any other type of pavement in this respect.

(5) Production of a uniformly smooth nonskid surface which will be safe in any weather for a number of years.

(6) Elimination of poor workmanship through the substitution of machinery for hand labor on all of the more important phases of the work.

(7) Reduction in rolling due to the particular arrangement of the paving mixture previous to rolling.

(8) Decrease in plant and street costs due to mass production and decrease in general contract costs due to speed of operations as a whole.

HISTORY

In this mechanical age, it may seem strange to you as it does to me that contractors were so many years in adopting the use of power operated spreading and raking machines for asphaltic concrete. Similar machines were readily accepted for producing smooth, well compacted concrete pavement, but the practical asphalt paving man always visualized innumerable difficulties which would assail him if he attempted to use similar machines on his work.

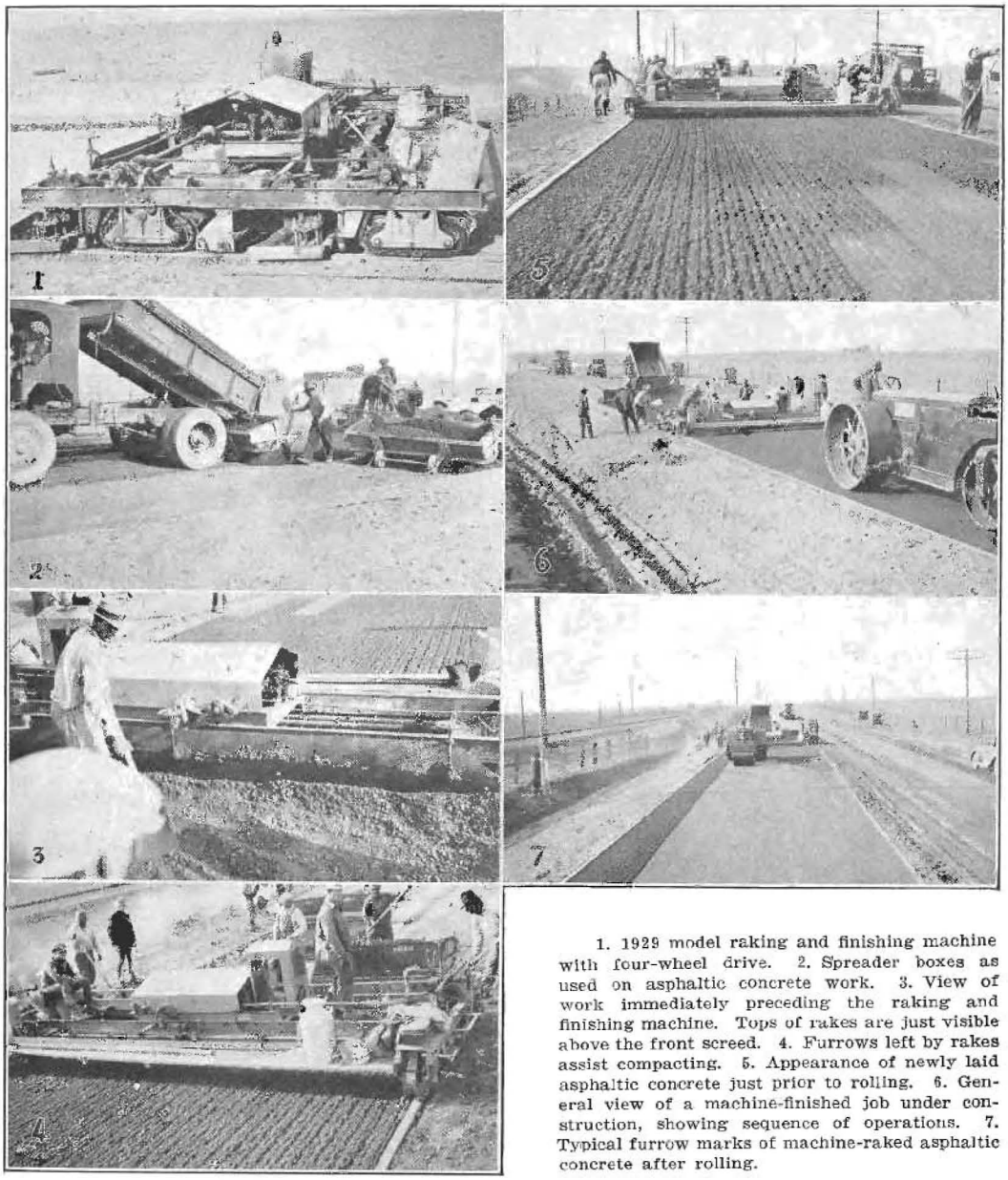
Proposals that it was feasible to spread and rake asphaltic mixtures with machines were met with many objections, since proved unsound. These objections impeded the general adoption of mechanical spreading for two or three years in California at least, after it was first suggested.

During 1924 or 1925, spreader boxes for spreading macadam rock came into general use and their success gave rise to our opinion that these boxes might be used to spread asphaltic concrete base, if contractors could be induced to try them. Their use on the first job on which they were tried allowed the contractor to take off a number of shovelers, so he was entirely agreeable to the next experiment which was to attach rakes to the spreader boxes to rake out the mix. This improvement allowed the contractor to take off one or two more men and convinced us that asphalt concrete could probably be raked and spread by machine methods.

Our spreader boxes were not so economical on the thin 1½-inch surfaces we were then laying in 1926, so we investigated the use of a large drag rake spanning the entire 20-foot width of roadway to be followed by a strike-off screed. These implements were at first drawn by hand and later by horse power. Both implements operated successfully and gave us a surface smoothness superior to anything we had been able to obtain by hand raking methods, but did not tend to increase plant output.

Through the cooperation of one of the larger road machinery manufacturers, we

* This paper was delivered before the annual convention of the Asphalt Associations, held at West Baden, Indiana.



1. 1929 model raking and finishing machine with four-wheel drive. 2. Spreader boxes as used on asphaltic concrete work. 3. View of work immediately preceding the raking and finishing machine. Tops of rakes are just visible above the front screed. 4. Furrows left by rakes assist compacting. 5. Appearance of newly laid asphaltic concrete just prior to rolling. 6. General view of a machine-finished job under construction, showing sequence of operations. 7. Typical furrow marks of machine-raked asphaltic concrete after rolling.

secured a standard concrete finishing machine and proceeded to remodel it at our own expense and thus completed the first attachments for raking and finishing asphalt concrete by mechanical means.

This machine was furnished on trial by the state to one of our contractors engaged in resurfacing a 10-mile section of highway. The working out of the usual defects which seem inherent in a new machine caused us all more or less concern but in the end the machine got down to work and turned out an excellent job which showed a roughness of about half of what we had been getting by hand raking. The successful use of this machine was followed very shortly by a decrease in our costs of asphalt concrete paving. So much for the early history of the development of the raking and finishing machines.

OBJECTS SOUGHT

The earlier purposes sought in the use of machines for raking and finishing asphaltic concrete pavement were several.

It was desirable to increase the amount of material which could be handled on the road beyond what was possible by hand spreading. Plant capacity could be increased by building larger plants and hauling equipment could be handled on the road, but because of the nature of the material it did not seem possible to place enough shovelers and rakers on a 20-foot road to handle the greatly increased tonnage required for economical work. In other words, the spreading and raking operations constituted the bottle neck of the job.

It was desirable that smoother pavements be laid because of the unfavorable comparison which constantly arose between Portland cement concrete pavements smoothly finished by machine methods and asphaltic pavements still finished by hand raking.

It was desirable that a nonskid surface be constructed which, while smooth, would still afford as safe driving in rainy weather as was claimed for the Portland cement concrete.

It was desirable to incorporate in the pavement construction such qualities as would insure a long life and freedom from objectionable waviness.

A considerable mileage of thin Portland cement concrete pavement, usually 15 feet wide and 4 inches in thickness, was constructed on the California highway system between 1912 and 1922. An unusual feature of this pavement was its high crown which averaged about 2¾ inches or about 3 per cent of the half width. This high crown eventually added about one inch additional average thickness for leveling course over the 15-foot width.

Due to the enormous increase in traffic, to faulty foundations, to under-design of the slab and other causes, a considerable mileage of this pavement began to show distress as early as 1916 or 1917 and the state has launched a program of reconstruction or surfacing these pavements to a width of 20 feet.

Highways in especially bad condition or which are subjected to truck traffic or to unfavorable climatic or topographic conditions are resurfaced with Portland cement concrete, while those in better condition or which are located in the valleys or other more favorable locations are surfaced with asphaltic concrete.

The asphaltic concrete type of asphaltic pavement has been chosen generally in California because of its economy combined with a durability equal to any other asphaltic type, and also from the fact that it presents a nonskid surface for a longer time than other plant-mixed asphaltic surface.

PREPARATION

In modern resurfacing operations because of the greatly increased output, great care is necessary in planning to insure smooth coordination between the plant, the hauling equipment, and the spreading and rolling operations.

PLANT

I will refer briefly to certain plant arrangements which have a bearing on our practice. A plant of considerable capacity is desirable, and common practice in California at the present time has fixed on plants producing from 2500 to 5000 pounds per batch as the economical size. Such a plant will turn out up to 65 batches per hour, if properly arranged and average outputs of from 500 to 800 tons per day are not unusual. While our specifications limit output to 65 batches per hour, the number may be increased should our laboratory and field investigations indicate that improved methods introduced by the contractor will produce a satisfactory mix in a shorter mixing cycle.

We have found it desirable to premix all of our aggregate before it is passed to the proportioning bins and this is accomplished either by mixing in layers at stockpiles or else by means of chutes which deposit layers of coarse and fine aggregate on a belt running under the storage bins and which feed the dryer. Weigh boxes are always placed with their outlets at right angles to the mixing shafts of the pug mill instead of parallel with the shafts, since the latter arrangement has a tendency to defeat complete mixing of the different sizes of aggregate.

HAULING EQUIPMENT

Because of the precarious condition of many of our concrete pavements, it is usually required that all hauling be done with pneumatic-tired trucks.

Since the usual load of mixture varies from 5 to 6 tons, the dual type of tire is in common use.

Trucks are usually fitted with convenient coupling devices placed forward of the middle of the truck for ease in attaching the chains by which the spreader boxes are drawn.

SPREADER BOXES

Two usual types of spreader boxes are in common use one of which is equipped with skids on which it is dragged forward and the other is supported by means of rollers. Both are equipped with more or less satisfactory gates extending the full width of the back to permit spreading the mixture to the proper

(Continued on page 28.)

Engineers Discuss Maintenance Problems

A CONFERENCE of District Maintenance Engineers and Superintendents was held in Sacramento on January 6th and 7th. This meeting was called by Maintenance Engineer T. H. Dennis, with the thought that it would offer an opportunity for a mutual exchange of ideas to the general benefit of the maintenance program.

Papers were prepared and read, covering the various phases of maintenance work, a general discussion following each paper as presented.

During the first day a number of oil company representatives were present to give the latest data on road oils, to which this day was largely devoted. The second day was devoted entirely to other maintenance problems. The program for the two days was as follows:

January Sixth

Opening Remarks—
Mr. Dennis, Maintenance Engineer.

Bitumuls for Maintenance—
Mr. McKesson, American Bitumuls Co. (Paper presented by Mr. Moskowitz).

Asphaltic Road Oils—
Mr. MacSwain, Gilmore Oil Co.

Asphaltic Road Oils—
Mr. Blood, Standard Oil Co.

Asphaltic Road Oils—
Mr. Borden, Shell Oil Co.

Dust Palliatives, Blanket Patches—
Mr. Vickrey, District Maintenance Engineer, District III.

Oil Macadam Blankets—
Mr. Holbrook, Maintenance Superintendent, District IV.

Asphalt Cutbacks—
Mr. Harris, Union Oil Co.

Oil Macadam Blanket—
Mr. Green, District Maintenance Engineer, District V.

Dust Oiling—
Mr. Fite, District Maintenance Engineer, District IX.

1. J. H. Gates. 2. S. E. Harris. 3. H. H. Summers. 4. W. H. Martin. 5. C. J. Sawyer. 6. A. J. Rivett. 7. G. E. Marshall. 8. R. A. Tremper. 9. E. J. Gribble. 10. G. P. Merrill. 11. L. H. Kahl. 12. C. W. Rust. 13. P. H. Wilson. 14. J. W. Vickrey. 15. E. Evers. 16. P. L. Fite. 17. G. F. Hellesoe. 18. L. H. Taylor. 19. F. E. Quail. 20. W. A. Smith. 21. T. H. Dennis. 22. J. G. Standley. 23. E. R. Green. 24. I. S. Voorhees. 25. R. P. Duffy. 26. C. E. Bovey. 27. E. T. Scott. 28. J. E. Stanton. 29. H. S. Clark (X). 30. R. A. Wilson. 31. L. D. House. 32. A. S. Moore. 33. Thos. Eastman. 34. R. S. Peck. 35. Kenneth Mendenhall. 36. C. A. Leighton. 37. C. A. Miller. 38. Norman Underwood. 39. G. H. Nutting. 40. L. C. Evans. 41. E. L. Stump. 42. J. W. Clark (II). 43. F. C. Macaulay. 44. O. F. Georges. 45. E. D. Willis. 46. C. E. Thompson. 47. R. K. Forrest.

Armor Coat—
Mr. Hellesoe, District Maintenance Engineer, District I.

Armor Coat—
Mr. Bovey, District Maintenance Engineer, District X.

January Seventh

Oiling Shoulders—
Mr. Eastman, Maintenance Superintendent, District VI.

Subdrainage—
Mr. Duffy, District Maintenance Engineer, District IV.

Traffic Striping—
Mr. Voorhees, District Maintenance Engineer, District VII.

Disintegrated Granite Road Mix—
Mr. Stanton, District Maintenance Engineer, District VIII.

Weed Burning—
Mr. Vickrey, District Maintenance Engineer, District III.

The following employees of the Maintenance Department were present:

District I—
G. F. Hellesoe, District Maintenance Engineer.
C. A. Leighton, Maintenance Superintendent.
Norman Underwood, Maintenance Superintendent.
C. A. Miller, Maintenance Superintendent.

District II—
L. H. Taylor, District Maintenance Engineer.
J. W. Clark, Maintenance Superintendent.
L. C. Evans, Maintenance Superintendent.
F. C. Macaulay, Maintenance Superintendent.
G. H. Nutting, Maintenance Superintendent.
E. L. Stump, Maintenance Superintendent.
E. J. Gribble, Maintenance Superintendent.
R. A. Tremper, Maintenance Superintendent.

District III—
J. W. Vickrey, District Maintenance Engineer.
R. H. Wilson, Office Engineer.
C. E. Thompson, Assistant District Maintenance Engineer.
C. W. Rust, Maintenance Superintendent.
R. K. Forrest, Maintenance Superintendent.
O. F. Georges, Maintenance Superintendent.
E. D. Willis, Maintenance Superintendent.

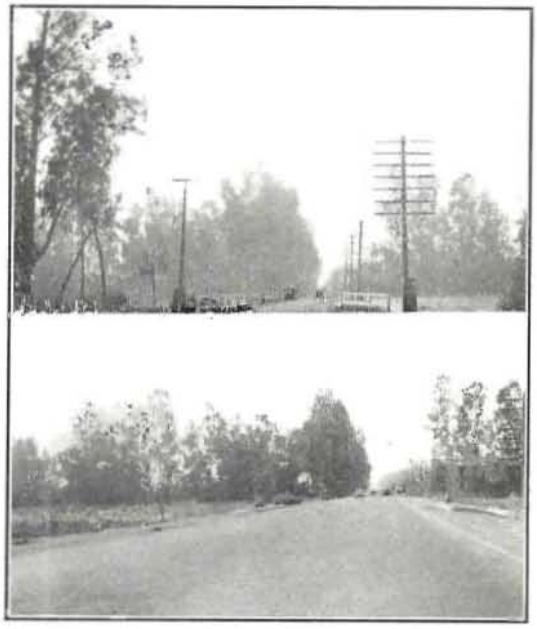
District IV—
R. P. Duffy, District Maintenance Engineer.
R. A. Wilson, Maintenance Superintendent.
W. F. Holbrook, Maintenance Superintendent.
A. S. Moore, Maintenance Superintendent.

District V—
E. R. Green, District Maintenance Engineer.
Roy S. Peck, Maintenance Superintendent.
Kenneth Mendenhall, Maintenance Superintendent.
L. D. House, Maintenance Superintendent.

District VI—
E. Evers, District Maintenance Engineer.
Thos. Eastman, Maintenance Superintendent.

District VII—
I. S. Voorhees, District Maintenance Engineer.
C. J. Sawyer, Maintenance Superintendent.
E. T. Scott, Assistant District Maintenance Engineer.

TWO VIEWS OF SAME HIGHWAY SECTION



Above are two photographs which are typical of recent improvement on part of the Los Angeles-San Bernardino Route, known as the "Foothill Boulevard." The photographs were taken at the same location before and after completion of the contract.

Note particularly that the culvert has been lengthened, the pavement has been widened from 18 to 30 feet in width, the pole lines have been set back, and the earth shoulders have been widened.

District VIII—
J. E. Stanton, District Maintenance Engineer.

District IX—
P. L. Fite, District Maintenance Engineer.

District X—
C. E. Bovey, District Maintenance Engineer.
H. H. Summers, Assistant Engineer.
J. H. Gates, Maintenance Superintendent.
S. E. Harris, Maintenance Superintendent.
G. E. Marshall, Maintenance Superintendent.
A. J. Rivett, Maintenance Superintendent.
Grant P. Merrill, Maintenance Superintendent.
H. S. Clark, Maintenance Superintendent.
W. H. Martin, Maintenance Superintendent.
L. H. Kahl, Maintenance Superintendent.

Headquarters—
T. H. Dennis, Maintenance Engineer.
W. A. Smith, Assistant Maintenance Engineer.
F. E. Quail, Assistant Maintenance Engineer.
J. G. Standley, Office Engineer.

Keep Scenic Highways Scenic

By Mrs. Charles N. Felton, Chairman, California Committee for Restriction of Outdoor Advertising.

THERE is something more important for California than the mere building of roads and highways, and that is the preservation of California's scenic beauties. In commercial districts where facilities of travel and the need for rapid transportation are the chief consideration, it can hardly be hoped, even by those who are most enthusiastic over the natural gifts of nature, that the native loveliness of the landscape be kept entirely unscarred, but it can be hoped that greater efforts will be made, wherever possible, in the near future, for the preservation of the scenic wonders which are such an asset to California.

Today California can boast of splendid highways, miles and miles of perfect pavement which traverse the entire length of the state and cross and recross its mountain ranges and broad, fertile valleys. Truly, Californians can be proud of the rapid steps which have been made in the development of routes of communication, but can we all be proud of the unsightly fringes which border our most traveled routes?

Glaring billboards, endless rows of signs, frightfully mixed vivid colors to attract attention; *these* are the scenic wonders of romantic California which visiting travelers can remember!

Each year the State Highway Division spends more and more money in order to open up new and lovely regions for the travelers and pleasure seekers. Mountain ranges and deep canyons, which until a few years ago were accessible only by pack train, can now be reached by the vacationist in his automobile in a few hours. Those who love the natural wildness of the hills and those who love the beauty of vast fields of grain and productive orchards, object to having the scenery ruined by the vast multitude of obstructing signs which dot our roadsides.

Just as the public schools of the state are advocating a broader educational program for the children, a program based on taste and appreciation, so are private individuals and organizations pitching into the task to educate the public to a keener appreciation of our natural wonders.

On September 12, 1929, a group of California men and women organized the California Committee for Restriction of Outdoor Advertising, the object of the organization being to help preserve the natural loveliness of the California scenery by striving to abolish unsightly signs which mar the majority of our highways. The incentive which is uniting these men and women in their protest has already gained the approval of many well known outdoor organizations of the state, among which are the Mills Club, the Redwood Empire Association, the San Francisco Garden Club, the San Francisco Society of Women Artists, the Sausalito Woman's Club, the Tamalpais Conservation Club, and the Tamalpais Centre Woman's Club.

The objects of the California Committee for Restriction of Outdoor Advertising are as follows:

To influence public opinion to protest against defacement of the landscape.

To influence advertisers to see that they are destroying an economic as well as an aesthetic feature of California by advertising on the highways, as this state depends more on her scenery for economic welfare than any other state.

To work for legislation which will prohibit advertising on rural highways.

The program which has been drawn up is:

To secure individual members by their endorsement of the pledge and an annual membership fee of one dollar.

To secure as cooperating members, sympathetic organizations by their endorsement of the pledge and their allowing their names to appear on the back of the C. C. R. O. A. stationery.

To promote state-wide interest in the objects of the committee.

To give to the cooperating member in each community a program to be carried out.

The men and women who are thus working for the beautifying of the state feel that it is not fair to those who love the glorious scenery which lies along the Pacific slope from the Mexican line past the summit of Mount Shasta, to allow a comparatively few business concerns to litter hilltops and creek beds, forests and pastures, mountain passes and desert wastes, with their huge, glaring placards which have multiplied to such an extent that they have become a well known foundation for national ridicule. It is felt that the state authorities could help, if when lovely sections of the mountains are opened to automobile travel, steps were taken to check roadside advertising. California is growing at such a rapid rate that unless open war is

(Continued on page 27.)

Traffic Control Position Supported

Railroad Signboards to be Removed

A Letter that Tells Its Own Story

Clippings, Letters and Comment

Dealing With State Highways

Drunken Drivers Have Licenses Revoked

Information Wins Appreciative Letter

Says Stripe Adds Two Feet to Road

Support for the position of B. B. Meek, Director of the State Department of Public Works that the through street as a means of traffic control presents difficulties not generally understood, comes in a letter to Director Meek from the National Safety Council with headquarters at Chicago.

Commenting on Mr. Meek's statement as published in the newspapers, the letter states that the National Safety Council has completed a "very careful study of accidents on through streets" and that its conclusions are much the same as those of Mr. Meek's, namely that "through streets are an overworked means of traffic control."

"We feel that through streets have a very general place in general scheme," the letter continues, "but especially where they are right of way highways, they may be a menace rather than a safeguard to the driving public."

Among other conclusions cited in the letter is the following:

"When properly established a through street will reduce collisions between automobiles, but pedestrian accidents often increase and the net result is ordinarily no material reduction in the number of persons killed and injured on the through street."

"Traffic on through streets can move more rapidly than that on unprotected streets without being granted special right of way privileges. After making a full stop, a vehicle on the cross street should be authorized to enter under the usual right of way rules."

"Too many through streets defeat their own purpose. Requiring the driving public to stop too often tends to belittle the importance of through-street stops, and makes enforcement difficult, if not impossible."

* * * * *

Railroad Signboards To Be Removed.

Newspapers in Marin County published the following article during January:

One more forward step in its campaign for the beautification of the Redwood Empire Highway System was taken Monday when, at a meeting of the executive board of the Redwood Empire Association, E. H. Maggard, president of the Northwestern Pacific, and vice president of the Southern Pacific-Golden Gate Ferries, Ltd., agreed upon the removal of signboards erected by those two concerns in the empire district.

The agreement to remove the signs, according to Maggard, was made in order to comply with the wishes of the people the rail and ferry companies serve, as expressed through the Redwood Empire Association.

All signs will be taken down immediately with the exception of a few directional boards, which Maggard said do not detract from scenic attractions and are not to be classed as traffic hazards.

* * * * *

This Letter Speaks Volume in Itself.

The following letter tells its own story:

Santa Monica, Cal.,
January 16, 1930.

California Highway Commission,
Sacramento, California.

Gentlemen:

With the conclusion today of nine days of continuous stormy, rainy weather in southern California I wish to take this opportunity to commend in the highest terms the work your representatives in this section have done.

No finer devotion to duty nor exhibition of capability has come to my attention than the efficiency of Mr. Jim Stauff, superintendent of maintenance in the Coast Highway division immediately northwest of Santa Monica.

During stormy weather this particular stretch of highway along the Malibu coast is undoubtedly the most difficult to maintain in passable condition of any major state road on your maps. Boulders by the thousands, rock, shale and mud slides, storm waters and a raging sea are the things with which this division has to contend.

Stauff and his crew met the emergency by working ceaselessly early and late to keep the highway clear. Our school buses at 6.30 a.m. found a clear road every day and the passenger buses at night had an equally passable right of way. And this has been true for 5 years.

We have found the Highway Department here to be most courteous and ready to cooperate at all times, including several favors from Mr. S. V. Cortelyou. I feel the least that can be done to express the obliga-

tion I owe your department is to express my thanks in this manner.

Whatever advancement may come to Mr. Stauff in the future I am sure will find him capable of meeting the situation as he has this and many other stormy weather emergencies.

Yours truly,

FRANCIS BRUNNER, Pres.
Santa Monica Mountain Coach Lines.

* * * * *

Property Owners Have Final "Say-so."

Owners of private property have the absolute "say-so" as to whether posters or unsightly advertising signs or structures are to be placed upon their land. Laws now on the California statute books not only prohibit placing of such signs on state property, which includes state highway right of ways, but provides for the possible removal of signs from private property.

The law is based on the fundamental invested right of property, points out the Automobile Club of Southern California, which broadcasts the state ruling which "prohibits the placing or maintaining of signs, mechanical devices, transparencies, pictures or advertisements upon property of any person or private corporation WITHOUT CONSENT IN WRITING THEREFORE HAVING BEEN FIRST OBTAINED."

* * * * *

Drunken Drivers Have Licenses Revoked.

Warfare waged against the drunken driver continuously during 1929 by state traffic officers resulted in the revocation of the driving licenses of 708 persons for periods of one year or more.

This was announced by officials of the California Highway Patrol who said drunken driving exceeded all other causes of revocation, being responsible for nearly two-thirds of all revocations for the year.

The records show 1162 persons in all were given official invitations to put their cars away for a year and try walking for a change.

* * * * *

Information Wins Appreciative Letter.

The following letter was received by State Highway Engineer, C. H. Purcell, from H. J. Whitley of Los Angeles:

Paso Robles, Cal.,
January 6, 1930.

It was very kind and thoughtful of you to advise me through your secretary, Mr. Cook, of the advertising of the "gap" in the paving of the highway to the valley, and I want you to know that I appreciate it.

This action on your part, it seems to me, is quite typical of the thoughtful consideration of the public and the thorough capability shown by every member of the highway organization with whom I have come in contact, from commissioners down to maintenance men.

The early completion of this work, in my opinion, should be of great benefit to this entire community and to the portion of the San Joaquin Valley served by this road.

* * * * *

A Little Late, But Still Welcome.

Here is a belated clipping that should have been reprinted in last month's issue of CALIFORNIA HIGHWAYS AND PUBLIC WORKS. It is taken from the columns of the Petaluma *Argus-Courier*:

A beautifully illuminated living Christmas tree in the yards of the maintenance and equipment department of the California Highway Commission on the Redwood Highway, below this city, is the center of attraction.

The tree, twenty-five feet in height, is covered with thirty lights, automatically controlled, which burn each evening from 5 to 10 o'clock.

The tree was placed in position by the maintenance and equipment employees of the commission in this district.

* * * * *

Says Stripe Adds Two Feet to Road.

George W. Ashley writes as follows relative to a road improvement on Cherokee Lane in San Joaquin County:

Greetings, and I wish to remark on the aid to driving the white stripe down the center of the state highway (Cherokee Lane) gives one. I think 90 per cent of the drivers respect it and it seems to have widened that road a couple of feet. I had a chance to specially notice this when driving to the south of Stockton in the rain to attend a public meeting the other night. Cherokee Lane pavement seemed wider than the new highway south of Stockton.

* * * * *

Scatter Salt To Fight Snow.

The following news article emanated from Redding:

Five thousand pounds of salt for distribution on the highway up the canyon was purchased by the State Highway Commission from the McCormick-Saeltzer Company yesterday. The salt was hauled away in one of the Commission's big trucks equipped with a snow plow.

The salt is scattered on icy turns on the highway, resulting in a loosening of the snow and ice for easy removal from the roadway.

OHIO—With a total of 6660 miles of hard-surfaced and 3837 miles of gravel roads, the state added 300 miles to each of these systems in 1929.

1929 Registration of Motor Vehicles Announced by Class and Counties

The Division of Motor Vehicles, Department of Public Works, has announced the total fee paid registration of motor vehicles by counties, for the period January 1, 1929, to December 31, 1929, as follows:

Counties	Autos	Solid trucks	Pneu. trucks	Motor-cycles	Trailers Solid	Trailers Pneu.
Alameda	135,892	1,590	3,503	847	418	1,172
Alpine	71	1	1	1	----	1
Amador	2,256	35	93	4	2	30
Butte	13,577	85	455	60	87	583
Calaveras	2,351	25	93	6	4	52
Colusa	4,226	31	161	5	40	187
Contra Costa	23,289	244	702	190	66	300
Del Norte	1,690	22	90	7	9	41
El Dorado	2,802	31	152	9	5	32
Fresno	53,521	643	2,379	289	589	3,159
Glenn	4,896	36	173	13	94	468
Humboldt	14,275	105	516	52	25	147
Imperial	21,495	107	1,243	73	78	443
Inyo	2,764	17	122	4	4	35
Kern	33,574	328	1,302	203	327	1,368
Kings	8,908	70	390	31	226	745
Lake	3,053	37	138	9	3	41
Lassen	4,152	14	158	16	7	79
Los Angeles	776,677	7,825	25,631	3,130	3,778	6,579
Madera	5,632	37	256	37	36	372
Marin	10,439	146	306	73	6	52
Mariposa	1,181	13	55	5	3	24
Mendocino	7,225	53	383	23	10	76
Merced	12,974	64	523	83	88	810
Modoc	2,637	15	114	3	2	39
Mono	414	2	32	----	----	2
Monterey	17,502	175	856	117	97	457
Napa	7,475	124	322	64	40	88
Nevada	3,153	25	152	13	6	23
Orange	45,810	295	1,810	206	768	942
Placer	8,652	54	330	36	13	136
Plumas	2,232	38	106	7	5	19
Riverside	28,833	157	1,086	147	336	921
Sacramento	43,832	467	1,846	220	184	842
San Benito	4,402	55	160	38	42	110
San Bernardino	44,509	227	1,826	184	337	837
San Diego	72,913	435	2,251	656	155	675
San Francisco	143,430	3,791	6,282	1,016	303	413
San Joaquin	36,019	417	1,456	229	324	1,493
San Luis Obispo	11,235	82	467	72	41	258
San Mateo	22,503	358	711	141	80	213
Santa Barbara	23,472	136	1,073	158	97	255
Santa Clara	52,285	616	1,719	315	571	1,149
Santa Cruz	13,928	145	638	120	53	245
Shasta	4,830	74	201	22	15	158
Sierra	783	4	29	1	----	3
Siskiyou	8,379	51	341	34	10	126
Solano	12,707	103	382	81	59	250
Sonoma	24,704	301	1,147	142	58	286
Stanislaus	23,465	130	1,094	123	268	1,598
Sutter	5,731	88	165	19	28	186
Tehama	5,250	25	140	16	33	352
Trinity	660	8	33	1	----	4
Tulare	29,070	242	1,316	135	406	2,325
Tuolumne	3,155	23	117	11	5	42
Ventura	20,626	160	917	66	242	563
Yolo	8,892	104	391	49	69	317
Yuba	4,900	59	155	16	23	141
Totals	1,885,308	20,543	68,490	9,628	10,635	32,264

Salinity Investigation

Now Asking Permits for Dams

Review of January Activities

In the

Division of Water Resources

EDWARD HYATT, Chief of Division

Flood Control and Reclamation

Irrigation District Matters

Water Rights

WATER RESOURCES STUDY

A statement of the work being conducted in southern California will be found on page one of this issue.

SALINITY INVESTIGATION

This intensive investigation has been continued during the past month with 26 regular salinity observation stations and 8 drainage stations being maintained.

Additional measurements have also been made to determine the division of stream flow in the Sacramento along the several channels. During this month ten sets of complete stream flow measurements were made including Georgiana Slough, Sacramento River below Georgiana Slough, Steamboat Slough, Sutter Slough and Three-Mile Slough.

Analytical studies are in progress in the office to determine the relation of salinity to the inflow into the delta and to tidal action. The study showing the variation of salinity throughout a complete tidal cycle for various degrees of salinity and for various characters of tide has been completed. A compilation has been made of the combined stream flow into the delta from 1924 to October 1, 1929.

SALT WATER BARRIER

Since the last report the division has received from the State Printing Office and distributed Bulletin 22, "Report on Salt Water Barrier below Confluence of Sacramento and San Joaquin Rivers, California," by Walker R. Young, Engineer, United States Bureau of Reclamation. This investigation was carried on from 1924 to 1928 by the United States Bureau of Reclamation, under contracts executed jointly by the Bureau of Reclamation, the Department of Public Works and the Sacramento Valley Development Association. The bulletin contains 667 pages of text and 131 plates and maps. Nineteen estimates of cost for barrier at several sites are included.

This bulletin is the first to be published and distributed to the public under the Water Resources appropriation made by the 1929 legislature.

The economic and engineering investigation of the salt water barrier outlined in last month's report is being actively pressed.

An agricultural field survey of the areas adjacent to the barrier is under way. Questionnaires have been prepared which will be submitted to the various interests which might be affected by the construction of the barrier. These will cover industrial, reclamation and agricultural developments.

Negotiations have been initiated for the cooperation of this department with the State Highway Commission, Fish and Game Commission, State Board of Health, United States War Department, Bureau of Reclamation, Coast and Geodetic Survey and Geological Survey on the several features in which each particular agency is interested.

A research of the historical records on irrigation and reclamation development has been started.

SACRAMENTO VALLEY

Water Supply Estimates—Estimates of seasonal run-off of all streams in the Sacramento Valley for the period 1889 to 1929 have been completed. Averages for the last five, ten, twenty and forty years for each stream and for the entire basin have also been estimated.

Land Classification and Crop Survey—The land classification has been completed on 4,250,000 acres and a crop survey made for the year 1929 for 3,500,000 acres. The map in the office of land classification and the compilation thereof are about one-half completed.

Well Records—Observations have been made on 230 wells distributed geographically in the Sacramento Valley during the past two months. Efforts were made to use as many of the wells measured by Kirk Bryan in 1913 as possible.

SAN JOAQUIN VALLEY

Main Supply Canal Survey—The surveys of the main canal from the Kings River to the Kern River have been continued throughout the month under unfavorable weather conditions. However, a total of 100 miles of line has been located from Kings River to McFarland in Kern County. About 60 miles of this have been mapped in the office. One route of the line from the San Joaquin River to Kings River has been completed and mapping is about one-half completed. A survey has also been initiated for the purpose of locating a canal from the Sacramento River at a point above Courtland along Snodgrass Slough to Mokelumne River and thence to the San Joaquin River.

Well Records—About three-fourths of the records on 3500 wells in the San Joaquin Valley have been transcribed and analysis of these ground water data has been started which required employment of additional men.

Land Classification and Crop Survey—Land classification and the crop survey of the entire valley from Stockton to Bakersfield have been completed in the field. A report on the area south of the San Joaquin River has already been rendered and a supplemental report on the area north of the San Joaquin River will be made within a month. Good progress has been made in the mapping of both the land classification and the crop survey.

SANTA CLARA (SANTA CLARA COUNTY)

Gaging stations have been installed on Los Gatos Creek, Guadalupe Creek, Stevens Creek and Alamitos Creek. An engineer and assistant have been retained who are actively engaged in the preliminaries of get-

ting the work started. Construction of additional gaging stations is under way.

NAPA VALLEY (NAPA COUNTY)

The work of measuring water levels has been started for the year and the work of measuring run-off and loss from the valley is actively under way.

SNOW SURVEY (STATE)

All arrangements have been completed for the surveys in each major watershed. The work in the past month has consisted of getting out final instructions and equipment to local observers. Field trips have been made to instruct observers at key stations where monthly surveys will be made and the January surveys have been made on some of the key station courses but complete surveys of the key courses can not be made until the present storms have abated.

In the office, work has continued in preparing maps for office and field use showing all pertinent data relative to the surveys. The data for past snow surveys, stream flow, precipitation, etc., are being compiled, analyzed for normals, etc., for use in connection with the bulletins and forecasts to be published when coming snow survey data are available.

DAMS

The law providing for state supervision of dams sets February 14, 1930, as the date on or before which applications for approval of existing dams shall be filed. Forty-two such applications were received during the month.

The city of Los Angeles has been sending in its applications steadily and its list is nearing completion. The San Jose Water Works has submitted applications for all of its dams. Aside from these two, there have been very few of the larger owners whose application record is nearly complete. Attention is called to the requirement of the law that applications for existing dams should be made by February 14. A great many are not in as yet, and all owners of dams should send their applications in immediately, if not already filed.

Applications for construction or enlargement have been received as follows:

Dam	County	Owner	Estimated cost
Brand Park	Los Angeles	City of Glendale	$120,000
Hollywood High	Los Angeles	City of Los Angeles	34,000
Eerly Dam	Modoc	(Enlargement only, to be raised two feet)	

Applications for repairs or alterations as follows:

Dam	County	Owner
Yorba	Orange	Anaheim Union Water Company
Spooner	Lassen	J. J. Fleming & Company

Both the above applications are for minor changes.

Plans approved for construction or enlargement:

Dam	County	Owner	Estimated cost
*Hansen	Los Angeles	Los Angeles County Flood Control District	$1,000,000
Brand Park	Los Angeles	City of Glendale	120,000
**Morena	San Diego	City of San Diego	

* This will be a flood control dam on Tujunga Creek, of the concrete arch type, 180 feet high.

** This is a rock fill dam on Cottonwood Creek, which is to be raised 5 feet, necessitating 11,000 yards of rock fill.

Plans approved for repairs or alterations as follows:

Dam	County	Owner
Lake Hodges	San Diego	City of San Diego
Chatsworth A	Los Angeles	City of Los Angeles
Shaver Lake	Fresno	Southern California Edison Company
Big Meadows (also known as Almanor)	Plumas	Great Western Power Company
Bear Gulch	San Mateo	Bear Gulch Water Company

Inspection of dams under construction, enlargement or repair:

Twenty-eight dams are under construction, enlargement or repair in the state at the present time, all being regularly inspected by the division. The larger of these are:

Dam	*County*
Lake Hodges	San Diego
Glendale Park Manor	Los Angeles
Lower San Fernando	Los Angeles
Hansen	Los Angeles
Juncal	Santa Barbara
Shaver Lake	Fresno
Moccasin	Tuolumne
Calaveras	Calaveras
Salt Springs	Calaveras
Chenery	Contra Costa
Big Meadows	Plumas

FLOOD CONTROL AND RECLAMATION

Maintenance of Sacramento and San Joaquin Drainage District

Sutter By-Pass—Routine maintenance; drainage pumps operated for short periods.

Wadsworth Canal—One dragline excavator engaged in cleaning out northerly mile of Wadsworth Canal.

Tisdale By-Pass—During the last high water, on December 17 or 18, a section of the sheet pile wall of timber along the cut in the center of the Tisdale By-Pass washed out. The length of the section is approximately 80 feet, and the levee adjoining was also taken out. Temporary retard work has been done to prevent a further breaking of the wall and washing of the levee until such time as a new section of wall can be driven.

Cooperative Bank Protection—Cooperative bank protection work for Reclamation Districts No. 673 and No. 900 has been completed. The completion of the work for Reclamation District No. 535 will have to wait for a lower river stage.

Retards—On the Feather River at Nicolaus two of the seven tree retards are completed, and preliminary work done for a number of others.

Feather River—At Robinson Bend a dragline excavator is constructing the barrier across Hefner Slough, which work is approximately 75 per cent complete.

Highway Protection—Contract has been awarded to Leonard T. Isham of Rio Vista for the construction of 850 feet of redwood bulkhead in the Sacramento River at Isleton. This work is in cooperation with the Division of Highways. Emergency work has been done in this place to protect the highway. This work consisted of placing brush mattresses to prevent further wash, and a timber bulkhead to hold the fill adjacent to the highway.

Emergency Flood Control land Rectification of Rivers—On Seven Mile Slough, in Reclamation District No. 2067, a section of bank 100 feet long has been protected with quarry rock, in cooperation with that district.

A small job of bank protection work on the Mad River (Humboldt County), on the property of James B. Moore has been completed at a cost of $400.

Sacramento Flood Control Project—The project construction clearing work in the Sutter and Butte Slough by-passes has been seriously interrupted by the rains. The two camps on the lower Sutter By-pass were discontinued on December 17, and the operations in Butte Slough were also discontinued at the same time. In the last week of December approximately 100 men were returned to work in the Butte Slough By-pass and in one of the lower Sutter By-pass camps, which was opened again for the purpose.

Five contracts are under way for clearing timber in the Feather River channel above Marysville, but not a great deal of work has been accomplished during this period on account of the weather. The work is approximately 25 per cent complete.

A field examination of the situation at Nelson Bend on the Feather River was made with the construction committee of the Flood Control Association, and a meeting of this committee was held in Sacramento on January 16 for discussion of this and other problems.

Russian River Jetty—The placing of the quarry rock along the jetty has been continued with a crew of approximately fourteen men. An average of 42 cars of rock are being placed per day, or about 150 tons. The job is 60 per cent complete.

Mokelumne River Improvement—The work of clearing the channel of the Mokelumne River in collaboration with the county of San Joaquin has been completed at a cost of $12,500.

Flood Measurements and Gages—During this period there has been much activity in connection with setting staff gages, conditioning the automatic water stage recorder stations, and preparing for making flood measurements.

Complete personnel has been arranged for 12 metering parties, and equipment has been prepared and set aside for each party. Each party chief has been furnished with a schedule giving all the information necessary to carry out the metering work under his charge.

During the minor flood in December, measurements were made as follows: South Fork of American River at Coloma, North Fork of American River at Rattlesnake Bridge, American River at Fairoaks, Bear River at Wheatland, Sacramento River at I Street Bridge, Tisdale By-pass, and Sacramento River at Verona (U. S. Engineers).

IRRIGATION, WATER STORAGE DISTRICTS

Irrigation Districts—Investigation and report made on progress and status of Vista Irrigation District (San Diego County).

Field investigations and studies were made for report on proposed Dixon Irrigation District (Solano County), comprising 5589 acres.

The users of water under the Sutter-Butte Canal system (Butte and Sutter counties) are dissatisfied with the operations of the company and are considering the formation of one or more irrigation districts. The Canal Company is a public utility with a service area of 140,000 acres in these counties, but actually serves water to less than half this amount of land. Rates have been increased in the past and an application for increase is now before the Railroad Commission. It is proposed to organize either one or several irrigation districts within this area, the proposed districts being as follows: Feather, Richvale, Rio Seco, and Sutter-Butte. Petitions for organization are being prepared for some of these districts and one, the Rio Seco (Butte County) comprising from 8000 to 10,000 acres, has been filed with the State Engineer. Investigations of the proposed districts are under way.

In 1929 the division issued Bulletin No. 21, containing histories and financial statistics of all irrigation districts in the state. It is intended to keep these data reasonably up to date and available to the public, and for this purpose a questionnaire has been forwarded to all districts requesting information as of January 1, 1930.

Water Storage Districts—A hearing has been set for February 4, at Hanford, at which the State Engineer will consider applications for exclusion of lands from the Tulare Lake Basin Water Storage District (Fresno and Kings counties).

The Kern River Water Storage District (Kern County) was dissolved by court action some months ago. The records of the district contain valuable engineering and other data and it has been arranged that these will be filed in the office of the county clerk at Bakersfield available to the public.

WATER RIGHTS

Application to Appropriate—During the month 18 applications were received; 35 of those pending were approved and 11 canceled.

During the period nine permits were revoked and five licenses issued.

During the year 1929 there was a reduction in the number of pending applications from 589 to 532, which indicates that the office is eliminating much of the "deadwood" which came during the period of activity in recent years.

ADJUDICATIONS

Whitewater River (Riverside County)—Five orders were entered, granting extensions of time to complete incomplete appropriations.

North Cow Creek—Report covering water-master service and investigation during the 1929 season was completed and copies thereof were forwarded to the various attorneys involved in the proceedings.

Shasta River (Siskiyou County)—Three opening briefs and two reply briefs covering issues raised by exceptions to Division's Order of Determination were completed and filed with the Superior Court.

MOTOR VEHICLE DIVISION REPORTS

FRANK G. SNOOK, Chief

The number of registrations including both pay and exempt vehicles for 1929 totaled 2,029,879, an increase of 7½ per cent over 1928. This registration was divided as follows:

Pleasure cars and commercial vehicles under 3000 pounds	1,916,379
Trucks	89,033
Motorcycles	10,180
Trailers	14,287
Total	2,029,879

The registration figures are of interest inasmuch as they check closely with the traffic counts conducted by the Division of Highways. These counts show that the volume of traffic on highways has increased at the rate of 9 per cent annually for the past 5 years. If this rate continues to hold until 1940, the Division of Highways will be expected to maintain the roads for twice the present volume.

The large registration, and particularly that of Los Angeles County, has created a problem of handling applicants for licenses to which consideration is being given. The state now has some land which may be available as a site for a Motor Vehicle Building in Los Angeles. This land is so located as to provide ample parking space for cars, and will be constructed to provide protection against inclement weather to applicants.

SUBSTANTIAL SAVING IN REGISTRATION COSTS

It is worthy of note that the registration this year was accomplished in 15 days less time than a year ago, with the same force of employees, and at a substantial saving to the state. The coming legislature should give consideration to a change in the time for license renewals so that mailing of plates could avoid delays consequent upon mail congestion during the holiday season.

SOLID TRUCKS DISAPPEARING

The figures also reveal that solid tired trucks are fast disappearing from the highways of California. During 1928 the registration of solid trucks totaled 36,618, as compared with similar registration of 20,543 in 1929.

CALIFORNIA HIGHWAY PATROL ORGANIZATION

The California Highway Patrol has been very active in organization work since the last report. To date 50 county captains have been formally appointed. The full strength of the patrol's personnel, including inspectors, captains, traffic officers, patrolmen and border checkers, now numbers 321, exclusive of all clerical help. Notifications have been served upon the board of supervisors of the several counties, requesting them to forward the names of men they desire to recommend for appointment.

FINE WORK OF FOG AND SNOW PATROL

During the recent snow storms extending over the state and a period of heavy fogs in the lower San Joaquin Valley, exceptionally fine service was rendered by the Highway Patrol. In the areas where fog was proving unusually hazardous, a special patrol was put into service. Its duty was to inform each individual motorist of the conditions they would encounter in driving through the fog. This patrol was kept on the job for 36 hours, and during this time no accidents were reported. Previous to the installation of this fog patrol, the accident death rate during the period of fog peril had averaged one motorist a day with many injured.

In the heavy snow storms of early January fine service was rendered the motoring public by the Highway Patrol, and particular mention should be made of the service of the Los Angeles Patrol on the Ridge Route and that of San Bernardino County at El Cajon Pass.

IOWA—In hard surface road building Iowa, which now has 1900 miles, heads the list of states in mileage to be constructed—750 miles will be paved each year in 1929-30-31, making a total of 4150 miles.

WORK SECURED BY JANUARY HIGHWAY CONTRACTS

In accordance with the policy of the Department of Public Works to award contracts so advantage can be taken of favorable climatic conditions for construction, the majority of the awards made during January were on southern California highways. The following statement shows the improvements that will be accomplished through January awards:

San Diego-Yuma Highway

A contract was awarded to the R. E. Hazard Contracting Company of San Diego for grading and paving with asphaltic concrete 5 miles of highway in Imperial County between Dixieland and Seely. The pavement will be 20 feet wide on a sand cushion over the existing oiled graveled surface. The construction of wide side ditches and raising the grade of the highway will eliminate flooding of the road from irrigation overflow. The contract price was $110,436.30.

A second contract on this same route provides for grading and paving with Portland cement concrete, 2.9 miles of highways in Imperial County extending from Meyers Creek bridge to 3 miles west of Coyote Wells. The pavement is to be 20 feet in width and will be placed on the roadbed which was built following the destruction of the old paved road by the flood of December 1926. The present improvement is located high enough on the mountain side to be safe from damage by future storms. The contract was awarded to Basich Brothers Construction Company of Los Angeles. The contract price being $121,148.90.

Nine miles of this highway between El Centro and Holtville will be graded and paved with Portland cement concrete under a contract awarded to A. M. Peck Company of Los Angeles. The contract price is $264,955.35.

Cholame Lateral

The Valley Paving & Construction Company of Visalia was awarded a contract to grade and surface with bituminous macadam 15.5 miles of this highway in Kern County. The termini of the contract are the westerly boundary of Kern County and the Junction Pumping Station. This highway connects the Coast Route at Paso Robles with the Golden State or the Valley Route at Formosa. Under this contract the roadbed is widened to 36 feet and surfaced with an adequate pavement which completes the paving of this entire route. It is a long step in bringing to a modern standard of construction, lateral highways connecting main arterials. The contract price was $264,655.25.

Coast Highway

Will F. Peck Company of Los Angeles was awarded a contract to grade and pave with Portland cement concrete, a section of the Coast Highway in Los Angeles County at Liberty Grade, about 1½ miles in length. The roadbed is to be graded 40 feet wide and the paving is to be 20 feet in width. This project is on the Ventura Boulevard and is located about 5 miles north of Calabasas. The new alignment straightens the present crooked road and gives a much easier grade. It marks the elimination of one of the few remaining "bad spots" along this artery. The contract price is $69,953.45.

In San Luis Obispo County between Santa Maria River and Los Berros Creek, on the Coast Highway, 7.2 miles will be graded and paved with Portland

cement. This will be possible through a contract awarded to J. F. Knapp of Oakland at a contract price of $272,648.05. This project is another step in bringing this important artery between Los Angeles and San Francisco to modern high standards. The work consists of widening the present 24-foot roadbed to 36 feet and placing new concrete 20 feet wide over the existing 15-foot pavement.

Also on this same artery in Santa Barbara County between Zaca and Wigmore, 4 miles are to be graded 36 feet wide and Portland cement pavement laid 20 feet wide over the existing 15-foot pavement. This improvement also includes several sections of realignment. Contract was awarded to Cornwall Construction Company of Santa Barbara at a contract price of $153,239.50.

Another contract on the Coast Highway extends from San Francisquito Creek to San Antonio avenue in Santa Clara County, a distance of 4.4 miles. It is to be graded and paved with Portland cement concrete and asphaltic concrete. The roadbed is to be graded to a width from 50 to 100 feet and the paving will be from 20 to 40 feet in width. Existing bridges will be widened. By straightening alignment and widening the highway and bridges this contract brings another section of the Coast Highway up to a very high standard of construction. The contract was let to Hanrahan Company of San Francisco for $264,926.95.

Arroyo Seco Highway

T. M. Morgan Paving Company of Los Angeles was awarded a contract to grade 1.5 miles of this highway in Los Angeles County immediately north of La Canada and to build a reinforced concrete arch bridge across Side Canyon. The roadbed will be graded to a width of 36 feet. This project is a continuation of the road now under construction from La Canada along the canyon wall of the Arroyo Seco and will add another mile and a half to this scenic drive. The contract price is $272,790.50.

Riverside Highway

Approaches to the Wineville subway under the tracks of the Union Pacific Railroad on the road between Pomona and Riverside in Riverside County will be graded and paved with Portland cement concrete 30 and 40 feet wide for 0.5 of a mile. This contract was awarded to Matich Brothers of Elsinore for a price of $42,592.50.

Cuyama Lateral

Contract was awarded to the V. R. Dennis Construction Company of San Diego to grade and surface with oil-treated crushed gravel or stone a section of the Cuyama lateral, 9.7 miles in length between San Emigdio Road and the Main Valley Route. The roadbed is to be 36 feet wide and the surfacing 20 feet in width. This project is on the newly adopted alignment of the Cuyama lateral which extends between Santa Maria on the Coast Highway and the Valley Route south of Bakersfield. The project is designed on a high standard of construction with adequate drainage enabling the road to be kept passable at all times. The contract price is $126,455.

Bayshore Highway

Following the decision of the State Railroad Commission upholding the California Highway Commission and the Department of Public Works in the contention that there should be no grade crossings on the Bayshore Highway, a contract was immediately awarded for a section of the highway between Redwood City and Steinberger avenue, San Mateo, over which connection can be made with the Peninsula Highway. The contract was awarded to Frederickson & Watson and Frederickson Brothers of Oakland for $406,145.20.

The roadbed of this section is to be graded 60 feet wide, and as soon as the roadbed has had time to thoroughly settle it will be followed by a surfacing contract. The roadbed in this contract is to be built up across tide lands by hydraulic fill from nearby sloughs and by material taken from higher ground just south of San Mateo. This contract calls for the removal of three-quarters million cubic yards of material and 320,000 pounds of reinforcing steel.

Golden State or Valley Route

A contract was awarded to the California Construction Company of San Francisco for grading and paving with asphalt concrete 8.6 miles between Pixley and Tipton on the main Valley Route in Tulare County. This improvement consists of widening the existing 20-foot roadbed to 36 feet and placing 20-foot surfacing over the present 15-foot pavement. Contract price is $240,109.60.

Pacific Highway

Wren and Greenough of Portland, Oregon, were awarded a contract for grading and surfacing with untreated crushed gravel or stone 7 miles between Yreka and the Klamath River in Siskiyou County. This project begins just about 2 miles north of Yreka and consists of grading the roadbed 30 feet wide and placing surfacing 20 feet wide. The new alignment, replacing the old crooked road by skirting the top of Shasta Canyon and crossing intervening divides, shortens this portion of the route. This project adjoins a recently completed section of the Pacific Highway between the Klamath River and the Oregon line. Contract price $571,626.25.

C. W. Wood of Stockton was awarded a contract for grading and paving with Portland cement concrete 0.7 of a mile of new alignment through the town of Dixon, Solano County, thus eliminating two well known and dangerous grade crossings. The new alignment follows Adams street through Dixon, remaining on the westerly side of the S. P. tracks. Contract price $27,974.80.

COMPLETION OF CONTRACTS

Coast Route

A contract for constructing the state's share of the grading and Portland cement concrete paving between Santa Ana and Anaheim in Orange County for a distance of 4.9 miles, and at an approximate cost of $190,000, has been satisfactorily completed and accepted. Griffith Company of Los Angeles was the contractor.

Another contract in Orange County for constructing a graded roadbed and placing Portland cement concrete pavement between Serra and San Juan Capistrano, for a distance of 0.7 of a mile, at an approximate cost of $36,100, has been accepted. Matich Bros. of Elsinore were the contractors.

In Santa Clara County, contract for constructing the Calabasas Creek channel change near Santa Clara, at an approximate cost of $6,975, has been satisfactorily completed. N. M. Ball of Porterville was the contractor.

Contract for constructing a graded roadbed and placing Portland cement concrete and asphalt concrete pavement between Sunnyvale and Santa Clara, Santa Clara County, for a distance of 4.5 miles, at an approximate cost of $229,100, has been completed and accepted. N. M. Ball of Porterville was also contractor on this work.

In San Diego County, a contract for placing bituminous macadam borders and constructing timber curbs between San Diego and Oceanside, for a distance of 3 miles, at an approximate cost of $36,600 has been satisfactorily completed. R. E. Hazard Contracting Company of San Diego was the contractor.

Markleeville Routes

A contract for producing and placing untreated crushed gravel or stone surfacing between Jackson and Pine Grove, in Amador County, on the Jackson-Markleeville road for a distance of 3.3 miles and at an approximate cost of $15,600 has been satisfactorily completed and accepted. George French, Jr. of Stockton was the contractor.

In Alpine County a contract for grading and surfacing with untreated crushed gravel or stone at Markleeville on the northern portion of the Bishop-Owens Valley-Los Angeles Route, a distance of but 0.3 of a mile, and at an approximate cost of $19,200, has been satisfactorily completed and accepted. Camino Construction Company of Palo Alto were the contractors.

Mother Lode Highway

Contract for producing and placing gravel surfacing from a point 2 miles south of Mokelumne Hill, in Calaveras County, for a distance of 2.2 miles at an approximate cost of $5,400, has been satisfactorily completed and accepted. The Adams Company of Angels Camp were the contractors.

Valley Route

In Sacramento County between Arno and McConnell's Station, on the main Valley Route, distance of 1.2 miles, a contract for grading roadbed and placing untreated crushed gravel or stone surfacing at an approximate cost of $61,100, has been satisfactorily completed in accordance with plans and specifications. Larsen Brothers of Sonoma were the contractors.

Redwood Highway

Contract for constructing a bituminous and water-bound macadam surfacing between Elk Valley and Smith River in Del Norte County for a distance of 3.8 miles at an approximate cost of $16,500 has been satisfactorily completed. J. C. Compton of McMinnville, Oregon, was the contractor.

In Marin County a contract for constructing a bridge across Novata Creek at an approximate cost of $29,758 has been completed and accepted. W. L. Proctor of Santa Rosa was the contractor.

McDonald-to-the-Sea Highway

In Mendocino County, contract for constructing a graded roadbed and placing surfacing, also building timber bridges between McDonald and Navarro, for a distance of 1.6 miles at an approximate cost of $88,300, has been satisfactorily completed and accepted. W. C. Colley of Berkeley was the contractor.

Pacific Highway

Contract for constructing a graded roadbed and placing asphaltic concrete and Portland cement concrete pavement from Ben Ali to Sylvan School, Sacramento County, for about 8.7 miles, and at an approximate cost of $347,700, has been satisfactorily completed and accepted. Frederickson & Watson and Frederickson Bros. of Oakland were the contractors.

Timid wife (to husband who has just fallen asleep at the wheel): "I don't mean to dictate to you, George, but isn't that billboard coming at us awfully fast?"

Hoover-Young Water Commission Organizes

THE joint commission appointed by President Hoover and Governor Young to study the water resources of California was organized at a meeting held in San Francisco on January 13th. This meeting was attended by Governor Young. State Engineer Edward Hyatt was appointed secretary. An invitation was extended to the Joint Legislative Committee to attend all the meetings of the committee. Appearance before the committee should be arranged through the secretary.

The membership of the Federal and State California Water Resources Commission as appointed by President Hoover and Governor Young are as follows:

United States members:

F. E. Bonner, Executive Secretary, Federal Power Commission, Washington, D. C. (representing Federal Power Commission).

Elwood Mead, Commissioner of Reclamation, Washington, D. C. (representing United States Interior Department).

Thos. M. Robins, Lieutenant Colonel, Corps of Engineers, United States Army, Division Engineer South Pacific Division (representing United States War Department).

California members:

George C. Pardee, Chairman, formerly Governor of California, President of the Board of Directors of the East Bay Municipal Utility District, and Chairman of the State Board of Forestry; Oakland.

William Durbrow, President of the California Irrigation Districts Association, and Manager Nevada Irrigation District; Grass Valley.

B. A. Etcheverry, Professor of Irrigation Engineering, University of California; Berkeley.

Alfred Harrell, Publisher *The Californian* and Director of the State Chamber of Commerce; Bakersfield.

W. P. Mathews, Member of the Colorado River Commission and Chief Counsel for the Los Angeles Department of Water and Power; Los Angeles.

Warren Olney, Formerly Associate Justice of the State Supreme Court; San Francisco.

Frank E. Weymouth, Formerly Chief Engineer of the United States Reclamation Bureau, and Chief Engineer of the Metropolitan Water District of Southern California; Los Angeles.

Ex officio members:

W. J. Carr, Commissioner, State Railroad Commission.

B. B. Meek, Director of the Department of Public Works.

A Chinese truckman in Vancouver sent the following bill to a grocer for delivering orders:

10 goes
10 comes—at 50 cents a went.....$5 00

BATTLING SNOW ON STATE HIGHWAYS

(Continued from page 4.)

unusual task for the Division of Highways, but their tireless efforts have proved equal to the task. During this period snow has been removed on some 800 miles of road.

The following letters indicate the appreciation of the public for the work done in keeping highways open.

Letter from C. G. Thomson, Superintendent Yosemite National Park:

I have just sent three wires to the News Services complimenting your Mr. Wallace on his fine maintenance of the All-Year Highway to Yosemite during the recent storms.

If the occasion arises, count upon our reciprocating this fine service.

Very truly yours,

C. G. THOMSON,
Superintendent.

Letter from the Automobile Club of Southern California:

January 16, 1930.

Mr. B. B. Meek,
Director of Public Works,
State of California,
Sacramento, California.

My dear Mr. Meek:

We want to tell you how much we appreciate the splendid work of District Engineers, Cortelyou and Sullivan, and their assistants in keeping the mountain roads of southern California passable during the recent storm. Maintenance crews and extra gangs were on the job day and night and in the face of the heaviest snow fall which southern California has enjoyed in many years kept travel moving with a minimum of inconvenience.

The Highway Commission is to be congratulated upon its efficient organization and I can assure you that its work is appreciated by the motoring public.

With kind personal regards, I beg to remain

Very truly yours,

AUTOMOBILE CLUB OF SOUTHERN CALIFORNIA,
E. E. EAST, Chief Engineer.

Letter from Ed. Hess of Stockton:

The writer was at Long Barn and Twain-Harte Lodge since January 9th, during the recent storms. While up there, many times I watched the road workers at their work, surely some rather hard work—blizzard and other bad weather and they managed to keep the road plenty clear of snow—several cars wide practically all the way.

I happened to read in a metropolitan newspaper "All points above Sonora reported totally cut off," etc.

After reading this I could not but help thinking of those road men, working as they did, and had the road cleared plenty wide—even working at night in blizzard weather, and then have the newpapers print such untrue reports. Please understand I have no property interests or business place along that highway, and no one asked me to write this.

About 40 to 60 cars were at Long Barn (20 miles above Sonora) Sunday. I stayed over two days more, and not one car that did not get away Sunday.

Letter from the Colfax Lions Club:

Colfax, California, January 22, 1930.

Mr. C. H. Purcell,
Sacramento, Cal.

Dear Sir:

At the regular weekly noon luncheon of the Colfax Lions Club, held on January 13th, a unanimous vote of thanks and appreciation was given your office for the wonderful work you were doing in keeping the Lincoln Highway, Route 40, open to travel and free from snow as far as the Blue Canyon Airport. There were over 1500 cars on this highway Sunday, January 19th, which traveled up into the snow. This work on your part means a lot to Colfax and the surrounding country as well as to the people who are able to come up and play in the snow, and the Colfax Lions take this means of expressing their appreciation of your good work.

Yours in cooperation,

COLFAX LIONS CLUB.
By F. E. West, Secretary.

Letter from George Herz:

San Bernardino, California, January 13, 1930.

Mr. C. H. Purcell,
State Highway Engineer,
Sacramento, California.

My dear Mr. Purcell:

I wish to take this opportunity to express to you and to the Highway Department, my observation and appreciation of the manner in which the highway employees handled the traffic congestion on the snowbound Cajon Pass, on Sunday, January 12.

I was snowbound on the Pass from one o'clock in the afternoon until after seven o'clock that evening, without being able to move in either direction, which gave me ample time and opportunity to watch your men trying to untangle one of the worst traffic jams that I have ever seen. It was one of the worst blizzards that I have ever experienced anywhere, not excepting the Rocky Mountains, and your men were right in the thick of it at all times. They never lost their tempers and were always cheerful, giving a helping hand wherever they could, until the knot was untied and the traffic began to flow in both directions again, which was after 7 p.m.

In talking to several of your men, I was informed that they had not been off of the job for over twenty-four hours, and had not had anything to eat during that time.

Inasmuch as I am engaged in road construction, I know from personal experience what it is to keep traffic moving and to keep everybody satisfied and in good humor. Therefore, I repeat again, that your men did everything humanly possible to keep everybody satisfied, and did the best that could be done under the circumstances.

With best regards, I remain

Yours sincerely,

GEORGE HERZ.

STATE SAFEGUARDS ITS CONSTRUCTION BY THOROUGH SUPERVISION IN FIELD

(Continued from page 9.)

tractor has laid out his lines it is the duty of the field superintendent to personally check every measurement for correctness and see that each nail or saw cut is properly indicated on the batter boards before any construction is begun. He must then see that these points are properly guarded and preserved during their entire usefulness and that they are available for future checking of work.

BEARING VALUES OF SOIL

Before a projected building is started in the designing room, a survey of the proposed site is made and where the soil bearing values are already known, test holes are dug adjacent to and within the lines of the foundation so that approximate footing depths can be determined.

When a site is selected on entirely new and unknown ground, the bearing value of the soil is determined by load tests prior to the design of the foundation footings.

During the excavating of footing trenches, etc., it is the express duty and responsibility of the field superintendent to carefully observe the nature and character of the formations encountered and the depths at which the proper bearing soil is found so that any necessary changes in the footing depths can be made by the structural designer which will effect a saving by change order to the contractor.

These observations also sometimes result in extra depth excavation requirements to reach proper bearing and in such cases the result is an extra charge by the contractor. The amount of this saving or extra, as the case may be, is determined by a fixed unit price in the contractor's bid which covers the material and labor involved. This unit price is called for in anticipation of possible variations and due to the fact that in order to obtain comparable bids the bidders must have definite depths to figure on.

These variations are measured both by the field superintendent and the contractor and agreed upon before concrete is poured. The figures are reported to the main office where the exact deduction or addition is calculated and settlement is made with the contractor accordingly.

One of the most important functions of our field superintendents at the start of a project is to see that the contractor proceeds early to arrange for delivery of concrete aggregates which he believes will pass the tests provided for in our specifications. Obviously this is necessary so that the contractor does not find himself without approved material when he is ready to pour footings.

TESTING MATERIALS

Usually only small amounts of each size of aggregate are delivered, pending result of tests, representative samples of these being selected by the field superintendent and divided into two parts, one to be forwarded to the testing laboratory and the other retained by him for comparison with subsequent deliveries in case the test proves satisfactory and the material is approved for use.

Reinforcing steel is also subjected to rigid tests and must be approved by the laboratory before it can be used. This test is sometimes made at the vendor's warehouse by a testing engineer from the state's laboratory to avoid expense of shipping and delay in case of rejection, and especially in cases where bending and fabricating is to be done at the warehouse before shipping to the job.

This method is obviously advantageous to all parties concerned and invariably results in more accurate bending than is usually obtained where the work is done on the site with the use of portable hand tools only. Contractors generally throughout the state have come to realize that this phase of the work on state construction is rigidly inspected and that narrow variation limits are imposed, and as a result, a constantly increasing better class of workmanship is being obtained.

Steel carefully bent to detail makes for simplicity in placing and saves labor cost in the field. Most experienced contractors prefer to sublet this branch of the work "furnished and installed" and naturally a better class of workmanship is obtained due to the skill and knowledge of specialists who install the work.

Many other materials which enter into the construction of the building from foundation to roof and finally on the finish such as stucco and paint, require tests and written approval before they are allowed to be used. When it is realized that the state is in the business of designing and constructing buildings for permanent use at the various institutions, and never for sale, it will be readily understood why these rigid tests are made and the specified requirements insisted upon.

REQUIREMENTS OF INSTITUTIONS DIFFER

Carefully thought out layouts for all piping and fixtures such as plumbing, steam, and electricity, are made by our mechanical section and these often call for special methods of installation due to the unusual requirements of individual institutions.

That which is proper practice at a hospital for insane is not altogether a proper installation in a prison and very naturally neither of these are suitable in administration buildings or residences. From observation and study reaching back over a period of many years, it has been possible to devise installations that meet practically every requirement and the various schemes are now pretty well standardized and satisfactory.

TRAINED IN WORK

It is an old truth that repetition of performance increases accuracy and efficiency and in the building game this is truly demonstrated.

By far the majority of our field force is composed of men who have been in the employ of the division for many years and have successfully conducted work of various kinds and magnitudes both by day labor and on contract basis and they have come to know the standards and methods which by test have proven most satisfactory and adaptable to the requirements of the various institutions. In their constant effort to obtain the best finished results, they have become weaned away from the practice of slipshod or questionable methods sometimes attempted by the less reliable or more careless contractors and are able to detect at once any tendency toward inferior work.

Since there is an appreciable degree of variation between most of our work and the every day run of work encountered by contractors, it can be readily understood that the experience of both our designing and field forces is a valuable asset to the division and represents a distinct intrinsic value that can not be denied.

Experience is a safe teacher and requires time and opportunity to achieve. The only known short cut to experience is constant contact with the work and an inquisitive and observing nature which demands to know why as well as how things are done, and an exceptional memory for detail of the things observed. A man with these characteristics will, and unquestionably does, go further in his line of endeavor in a shorter time because his knowledge is supported by a background of experience which is ever at hand to provide resources to guide him. This is usually the type of man who finds new applications of old principles, or combinations of them, which tend to advance his profession.

Some of the greatest requirements of a field superintendent or resident engineer are, fundamental knowledge of building principles, wide experience in the various applications of those principles, ability and willingness to acquaint himself with the detailed requirements of the project in hand through the medium of the plans and specifications, a forceful character with executive ability and tact, and above all, integrity and loyalty to his superiors.

The Division of Architecture is now busily engaged in keeping up with the construction program for the present biennium and the work both in the office and in the field is being carried forward according to schedule.

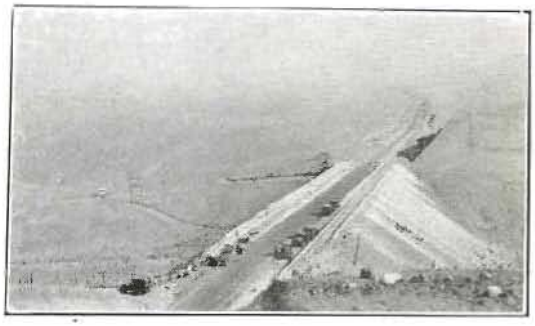
KEEP SCENIC HIGHWAYS SCENIC

(Continued from page 15.)

declared against the roadway advertisers in real earnest by those who love and appreciate the beauties of the state, it will not be long before the lovely drives which are still unmarred will likewise fall a prey to the sign board artist and the out-of-door paper hangers.

When the need for state legislation directed against the inroads of the advertisers is fully realized by the public the members of the California Committee for Restriction of Outdoor Advertising feel that their efforts will be appreciated and sponsored. The desire to make the whole of California into a glorious park is the end in view. No public parks in the state permit roadside advertising to detract from the beauty of the surroundings, and therefore the entire state can never lay claim to being a continuous park until regulations, which hold good in more restricted areas, are enforced along the highways.

LARGE FILL MADE BY SLUICING METHOD



The above view is that of a large fill on Kern River road about 10 miles east of Bakersfield which has recently been completed. The fill has a maximum height of 77 feet and was constructed mostly by sluicing. This section is on the Santa Maria to Freeman highway via Bakersfield and Walker's Pass.

This second picture is that of the large cut lying just to the west of the large fill above mentioned and from which material was obtained to construct the fill. The cut has a maximum depth of 66 feet and approximately 80,000 cubic yards were removed, all of which was used to construct the fill. This large cut and fill are portions of a line change about three miles in length, which shortened the distance between Bakersfield and Kern Canyon by one-half mile.

MACHINE FINISHING FOR HOT-MIXED PAVEMENT IN CALIFORNIA

(Continued from page 13.)

thickness. Some difficulty is experienced in making the ribbons of mixture deposited by the spreader boxes lap over each other without rock pockets developing. One of the best methods to secure this result is to cut holes about six or eight inches square in the ends of the spreader box near the front of the box which will allow sufficient average mixture to run out to make the junction of the ribbons satisfactory.

We have found spreader boxes economical and satisfactory whenever a uniform thickness of surface of considerable depth is to be spread. Some contractors claim little saving where a surface less than 3-inch loose is to be spread. In spreading leveling course, contractors have resorted to numerous ingenious methods of spreading the surface of the course parallel with the true surface.

SIDE FORMS AND RAILS

Since it is now our common practice to require that side forms be left in place, such forms are of wood, usually a commercial, three inches in thickness and as deep as the pavement.

They are supported on hubs at four-foot intervals and are securely staked to prevent lateral movement. We require all forms to be surfaced on both edges. While it is quite possible to spread base or leveling course from the wooden side forms, it is not possible to spread surface with spreading machines as at present designed.

It is necessary to make an allowance for compression and for this purpose it is common practice to lay flat steel rails about three-quarters to seven-eighths of an inch in thickness by 2½ inches to 3 inches in width on top of the wooden side forms to elevate the finishing machine a sufficient distance above the side forms to allow for compaction during rolling. These rails usually have a V-shaped or tongue and groove connection with each other to preserve alignment and are about ten feet in length. Usually three or four sets of rails are sufficient on the average job, as they are taken up and moved ahead as the work progresses. It is usual to nail the rails temporarily to the side forms.

FINISHING MACHINES

Two types of finishing machines are now in use in California both of which will spread, rake, and finish asphalt concrete. Both types of machine are motor-driven and consist essentially of front and rear screed plates set about 10 feet apart, having a motion transverse to the pavement at the same time that the machine advances along the side forms. The raking elements are set in between the screeds and consist of steel pins set in heavy pipe as described elsewhere.

We require not only spreading but also raking and respreading by the rear screed on all of our work and in this respect our practice differs somewhat, I believe, from other localities where spreading only without raking is a usual practice. Since we have not tried our machines on sheet mixtures, I am unable to say from actual experience whether raking of these mixtures is essential with a screed machine, but from a large experience in laying sheet asphalt by hand methods, I would consider raking such surfaces as essential as raking asphalt concrete.

The two types of rakes mentioned, and which I will designate as the pendulum type and the sliding type, represent the different ideas of the manufacturers but they perform similar work.

The rake teeth which consist of steel pins from 8 inches to 14 inches in length and one-half to five-eighths of an inch in diameter are set 6 inches or less apart in two lines of double thickness pipe of 2 inches to 2½ inches nominal diameter. The teeth are adjustable for projection and are fixed in place with set screws. The rake assembly extends the width of the machine, 10, 15, 20, or 30 feet as the case may be. The essential difference in the two types of machine now in use is the method of raking used.

In one machine, the rake teeth swing with a pendulum motion in opposite directions which stirs up the mixture in line with the direction of travel.

In the other machine, the entire rake assembly slides backward and forward between guides, the teeth plowing under and lifting the mixture at each forward stroke, and on the backward stroke assisting slightly perhaps the forward movement of the machine.

Both the pendulum and sliding motions are induced by means of an eccentric connected to a countershaft and operating crank arms which swing the rake's teeth or cause the whole raking element to slide.

The second method has, I think, certain advantages over the first, especially for thin surfaces.

The teeth are set to rake at from 16 to 20

strokes per minute, and have a travel independent of the forward motion of the machine of from 4 to 8 inches. It is not desirable that the rake speed should be too fast nor the stroke too short. The sliding type of rake may have a longer stroke and be slower than the pendulum type.

Essential features of the raking are the lifting of the coarser aggregate to the surface of the mixture and the formation of compression ridges. The coarse aggregate being lifted to the surface allows it to be reimbedded in the immediate wearing surface by rolling and thus forms a nonskid surface. The compression ridges between the furrows left by the rake teeth have a tendency to assist compression without distortion or travel in the mixture since the ridges are flattened out sidewise by the roller instead of being driven ahead by it.

PAVING OPERATIONS

The paving operations in the construction of base and surface are as follows:

Paving mixture heated to approximately 280° F. is brought to the road in pneumatic-tired trucks of 5- to 6-ton capacity

If a leveling course is to be laid on old concrete, a paint coat of emulsified asphalt is first applied to the concrete base.

The trucks are backed up to spreader boxes and are attached to them by means of a quick detachable chain hitch.

The mixture is roughly spread about 2 inches thicker than it will be left by the finishing machine and is at once spread to a uniform thickness using the screeds of the finishing machines only as a usual thing. Some operators use the rakes also as they think they assist compression. Rolling is begun as soon as the machines have spread a sufficient amount of material. Practically no handwork is required on the base mixture.

Base mixture is usually carried forward for such a distance as to allow a full day's run on surface, or for even a longer distance so that it will not be necessary to make so many shifts of the finishing machine. On one large job at present under construction, two finishing machines are in use, one on base and one on surface, which obviates the necessity of moving either one back on the job. Machines are usually moved off the pavement at night to permit its use by through traffic.

Surface operations follow closely on the methods used in constructing base with a number of additional operations, however. It is first necessary to lay steel rails three-quarters to seven-eighths of an inch thick on top of the side forms, as hereinbefore described, to give the screeds the proper elevation above the side forms to allow for compression in rolling.

The screeds, which are cut at the center, are adjusted to the correct crown by means of hand wheels. The rake teeth are lowered into the mixture and in the sliding type are set at an angle of about 45 degrees.

During operation, it is desirable to carry a wave of mixture about half the height of the front screed in front of that screed and a smaller wave of mixture in front of the rear screed.

During the operation of the machine, the rakes are forming ridges and furrows longitudinal with the road and the rear screed is just knocking the top off the ridges, leaving coarse aggregate exposed for rolling. The machines are usually equipped for four wheel drive and will operate at a forward speed of up to 10 feet per minute.

ROLLING

Rolling is done with 10-ton macadam rollers for the first compaction followed by 6- to 8-ton tandem rollers for final smoothing.

Following the first rolling of the surface, our customary practice is to scatter asphalt coated stone chips, passing three-eighths inch and retained on one-quarter inch over the surface to fill any small voids which may be left in the surface and to provide additional assurance that the surface will be of uniform nonskid texture. Rolling is then continued until no more compaction is possible and the surface is as smooth as it can be made.

SMOOTHNESS

Surface smoothness is checked during construction by several different methods devised by ingenious resident engineers. The simplest method is, of course, to use a 10-foot straightedge, but as this requires a good deal of stooping, other means have been devised.

One automatic device consists of a straightedge on three wheels so arranged that a rise or fall of the central wheel of more than one-quarter inch rings a bell; another has a similar bell arrangement but the straightedge consists of two sled runners, while another is a weighted sled which scores the high points as it is dragged after the roller.

The official record of roughness, however, is recorded on a vialog or roughometer attached to an automobile operating at twenty miles per hour. This machine is left constantly calibrated by checking its operation over two or three standard sections of pavement which have been run over many times

and on which the roughness has been accurately determined.

The following tabulation indicates the average smoothness we have obtained on some 200 miles of asphalt concrete pavement laid in the last five years:

Year	Miles laid	Roughness index	Remarks
1924	23.84	30.1	Hand finish
1925	24.11	33.2	Hand finish
1926	49.34	24.1	Hand finish
1927	35.35	25.2-14.6	Machine finish begun
1928	60.81	30.9-14.7	

We have been able to reduce the roughness to as low as eight units on some especially well finished jobs without sacrifice of the nonskid feature.

We find that roughness increases with each year a pavement is in use. One of our asphalt pavements laid three years ago with a roughness index of 11 now has a roughness index of 14.

OUTPUT

The introduction of finishing machines has, as stated before, greatly increased the average tonnage output of paving plants, and has also decreased the cost per ton as shown in the following tabulation:

Year	Tonnage Max.	Per 8-hr. day average	Average cost per ton
1924	244	194	$7.27
1925	319	214	6.43
1926	388	333	5.13
1927	366	352	5.68
1928	574	404	4.89

Naturally, this increase in output has required larger plants, and where a 1500- or 2000-pound batch box was the usual size in 1924, we are now using batch boxes up to 5000 pounds capacity with the cost of the plant in proportion.

In conclusion, I wish to predict that the more extensive use of machinery in the construction of asphaltic pavements has opened a new era for this material and that with the growth of knowledge as to the economic and engineering considerations which should govern the selection of pavement types, the use of asphaltic pavements in their proper locations will reach proportions sufficient to satisfy its most ardent advocates without detracting from the merits and usability of other types of pavement in their proper environment.

For those who wish to trace the development of machine finished asphalt construction, the following references will be of value:

Engineering News-Record

(1) Dec. 1, 1927, p. 869.
Equipment to replace hand tools, in surfacing asphalt. (Hand operated strikeoff rake—Exper. by C. S. Pope).

(2) Oct. 13, 1927, p. 602.
Concrete road finishing machine used on asphalt by Griffith Company (at Placentia, Orange Co., Cal.). Paving work.

(3) Mar. 29, 1928, p. 510-11.
Concrete finishing maschine spreads asphalt surfacing. By Guy H. James, resident engineer, Oklahoma State Highway Department.

(4) Apr. 5, 1928, p. 536.
Machine-finished asphalt—Editorial.

(5) Apr. 12, 1928, p. 591.
Blade grader finishes asphalt road surface. By W. G. Dickey, Richmond, Ind.

(6) Nov. 15, 1928, p. 727.
Rotating rake on Finishing Machine spreads rock asphalt. By John L. Humbard, Knoxville, Tenn.

(7) Apr. 18, 1929, p. 623.
Machine-finished asphalt pavt. adopted in Cal. By C. S. Pope, Construction Engineer, California Division of Highways.

(8) Mar. 7, 1929, p. 376.
Finishing machine lays asphalt in Oklahoma. By D. A. Wood, Engineer of Tests, Oklahoma Highway Commission.

(9) Mar. 21, 1929, p. 471.
Hand and machine spread asphalt costs compared. By J. F. Tuttle, Ass't. Div. Engineer, South Carolina.

THE ROAD BUILDERS

O, Brothers of the open road,
Be mindful in your motors,
Of this, our common gift bestowed
By less enleisured voters.
Be mindful how these thorofares,
Were made to serve all comers—
The meek and humble millionaires,
The plutocratic plumbers.

O, Brothers, when you motor out
In double fours or fivers.
To lamp the ladnscape round about
And agitate your livers.
The while your gas-consumer flies,
O'er beaten trails and byways—
O, breathe a prayer and bless the guys
That built the bloomin' highways.

Be mindful of their lowly lot.
They rarely ride as you do.
You drive nice cars, but they do not,
At least a very few do.
And life would be a dreary hike
If it were not for fellows like
The ginks that give us highways.

—*C. Wiles Hallock.*

CALIFORNIA HIGHWAYS AND PUBLIC WORKS

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Editors of newspapers and others are privileged to use matter contained herein. Cuts will be gladly loaned upon request.

B. B. MEEK ..... Director
GEORGE C. MANSFIELD ..... Editor

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CALIFORNIA—PLAYGROUND OF THE WORLD

Records of the Division of Motor Vehicles and the California Highway Patrol revealed that motorists from every state in the Union and practically every important country in the world visited California during the tourist season of 1929.

The time-honored slogan of California boosters that the state is the "playground of the nation" changed to the playground of the world for even such obscure countries as New Zealand, Guam and Panama sent their quota of pleasure seekers by motor.

Under the law providing that visitors permits be issued for nonresident cars in the state ten days or more, the records reveal 90,083 permits issued for the year. Approximately 140,000 nonresident cars were checked through the border "courtesy" stations maintained by the patrol. It is estimated that some 30,000 more came into the state over routes on which stations are not maintained.

State officials estimate the average number of persons in each car at three and that these tourists spent sums here totaling millions. Thousands of these motorists remain to make their homes here.

The largest number of foreign cars—53,909 in all—were checked through the border station located at Yuma. The Daggett station checked 36,657 more, the Dunsmuir station 29,257 and Clam Beach station 15,694. The stations at Donner Lake and Myers, operated only a portion of the year because of the heavy snow, checked in 7712 and 1598 respectively.

Of the states from which nonresident cars came, Washington led with 11,312 and the sister state of Oregon was second with 9600 Colorado was fourth with 6000 and Arizona fifth with 5100.

The Down East country was well represented with 151 cars from Maine, 71 from Vermont, 105 from New Hampshire, etc.

All the Dixie states had their quota, Virginia leading with 224. The folks from Iowa had 2660 visitors and 4560 came from Illinois.

France had nine cars here during the year and Germany had four. One motorist came from Japan and another from Italy. Our Canadian neighbors were interested enough to send 800 visitors.

California offers extremely liberal registration inducements for the out-of-state motorists as they may stay here six months without securing a California license.

Nonresident permits by state and country follow:

Total Nonresident Permits Issued for Year 1929

Alabama	182	Mississippi	96
Alaska	48	Missouri	2,340
Arizona	5,100	Montana	1,340
Arkansas	530	Nebraska	2,140
Australia	1	Nevada	2,160
Baja California	3	New Hampshire	105
Brazil	1	New Jersey	840
Canada	800	New Mexico	890
China	4	New York	3,240
Colorado	6,000	New Zealand	1
Connecticut	360	North Carolina	155
Cuba	4	North Dakota	630
Delaware	43	Novia Scotia	2
Dist. of Columbia	344	Ohio	3,400
England	8	Oklahoma	3,040
Florida	530	Oregon	9,600
France	9	Panama	18
Georgia	162	Pennsylvania	1,800
Germany	4	Philippine Islands	14
Guam	4	Rhode Island	138
Hawaii	288	South America	3
Idaho	2,050	South Carolina	55
Illinois	4,560	South Dakota	810
Indiana	2,100	Tennessee	372
Iowa	2,660	Texas	4,380
Italy	1	Utah	2,760
Japan	1	Vermont	71
Kansas	2,420	Virginia	224
Kentucky	340	Washington	11,312
Louisiana	311	West Indies	1
Maine	151	West Virginia	219
Maryland	232	Wisconsin	1,280
Massachusetts	700	Wyoming	900
Mexico	56		
Michigan	3,580	Total	90,083
Minnesota	2,160		

LINES TO EINSTEIN

In intellect you're over us
By something like 1,000,000 +
You plot your theory and its sequels,
Nor need to bow to peers or =
And tell professors how you've fared
With 7y or $2x^3$.
While we don't even dare to try
To guess what light's ÷.
We've not the sense to give a hoot
About infinity's √
—And yet we hope you won't malign us
Because our intellect is —.

—*Passing Show.*

Stopped by a motor cop for speeding, a motorist explained that he was rushing to see his lawyer. "That's fine" said the cop, "you'll have more news for him now."

U. S.—State Join to Solve Problems of Water, Bay Bridge

The following articles were carried by the Associated Press dispatches under the dates appearing below:

WASHINGTON, Aug. 13.—President Hoover announced today that he and Governor C. C. Young of California had agreed to the appointment of federal and state commissions to study two outstanding problems of the golden state: water power development and the bridging of San Francisco Bay.

The decision was made known at the White House by the President who holds a two-fold interest in the undertakings, that of chief executive of the nation and as a citizen of California.

TWO COMMISSIONS

One commission will take under advisement the development of California rivers with a view to irrigation, navigation, flood control and power. The other will devote its attention to a solution of the problems involved in the proposed construction of a bridge from San Francisco to Alameda.

The commissions are the result of extended collaboration between the President and the Governor, in the course of which the two subjects were gone into thoroughly.

The Water Commission is to develop a coordinated policy of water development. Mr. Hoover explained that at present there were nine independent agencies involved in water development in the state and that it was proposed that the work and programs of each should be coordinated.

The Bridge Commission is to determine upon a suitable location for the proposed span.

President Hoover's policy is expected to have far reaching effects on the future development of California, both agriculturally and industrially.

COMPLETE COORDINATION

The policy embraces complete coordination between federal and state governments in policies to be pursued in a long view development of the President's adopted state as to immigration, flood control, navigation and power.

The President announced he had requested the War Department, which controls navigation channels and flood control, the power commission, which controls water power permits, and the Interior Department which is interested in irrigation, to designate one member each on the commission which Governor Young is appointing from among state agencies and leading citizens.

Some years ago Mr. Hoover advocated coordination of a multitude of activities, government and otherwise, engaged in direct and indirect control and development of a California water supply. This long has been the subject of deep interest to him because of intimate personal knowledge of the situation gained in his many visits to various parts of the state.

WATER PLAN ESSENTIAL

His view, as expressed often to friends in days before he became President, is that a comprehensive plan for development and utilization of its existing water supply is absolutely essential to the full growth of the great empire west of the Rockies. He estimated that hundreds of thousands of potential horsepower flowed annually to the sea almost unharnessed and unchecked. With this went millions of gallons of water which might be utilized for irrigation purposes, making fertile thousands of acres of now practically waste lands.

The task ahead of the state and federal governments is recognized as a gigantic one, but opinion in administration circles is that it at least can be simplified through closest cooperation between federal and state agencies which for years have been acting independently and in more or less haphazard fashion.

TO PRESERVE FORESTS

Involved in the program is the preservation of forests so that snows will not melt rapidly in the spring, causing floods and a resultant shortage of water in late summer. This problem has long given concern, and for many years there has been an almost imperceptible but gradual shortening of the water season, not only in California, but also in other states.

Anxious to remove difficulties which have stood in the way of erection of a bridge across San Francisco Bay, President Hoover, in cooperation with Governor Young, has determined upon appointment of a commission representing state and national interests to make a study of the project.

HOOVER WANTS BRIDGE

Mr. Hoover said he regarded the proposed bridge as of great economic value to San Francisco, Alameda and Oakland, and a project which should be carried through to completion.

The commission determined upon is to consist of two representatives of the War Department, two from the Navy Department, two from the State of California and one each from San Francisco and Alameda, and a westerner to represent the Federal Government generally, who will be Mark L. Requa, Mr. Hoover said, if he will undertake the task.

One of the first duties of the commission will be to determine upon a suitable location for the bridge. The next step will be securing complete consent of the War and Navy department for construction of a span at that place. Construction of the bridge has been the subject of considerable dispute in Washington in recent years. Hearings have been held by both houses of Congress and the War Department. Considerable objection has been raised by the War and Navy departments on the ground that such a bridge would be a threat to the defense of San Francisco Bay.

YOUNG AND HOOVER STUDY PROBLEMS TWO YEARS

LOS ANGELES, Aug. 13.—(AP)—Governor C. C. Young told the Associated Press at his office here today the agreement reached in Washington for a joint federal and state commission to study facts as to developments of rivers in California culminated negotiations begun more than two years ago between himself and President Hoover, then Secretary of Commerce.

The Governor said legislation passed at the last session of the legislature made it possible to bring these negotiations to an end, and Director of Public Works B. B. Meek had been sent to Washington to confer with the President upon the appointment of such a commission.

"I am happy to hear that a basis upon which the state and federal government may proceed together in the development of California rivers for irrigation, navigation, flood control and water power has been reached," Governor Young said.

The Governor added that appointment of the California commission must await the return of Meek, as he wished to talk over with him the attitude of the federal government on the developments before making definite selections.

HOOVER IN SYMPATHY

"Mr. Hoover early expressed sympathy with the projects contemplated and showed a clear understanding of the values to be derived from the development of California rivers," Governor Young said. "The appointment of a joint commission to survey our natural resources virtually guarantees the working out of an acceptable basis of problems arising from their development affecting both the state and the nation."

Governor Young said he had instructed Meek to confer with federal authorities upon questions arising from the proposed construction of a bridge across the San Francisco Bay, after discussion of California river development had been culminated.

BRIDGE PROJECT VITAL

"The project is of vital interest to the state and the San Francisco Bay region," Governor Young said, "but was secondary to the major object of securing cooperation towards the development of rivers.

"Before Meek left for Washington he suggested that while he was there he should seek federal cooperation on the bridge project, and I assented."

Governor Young expressed gratitude that a federal bridge commission had been authorized. In his opinion, he said, a survey by the federal group would be a great factor in the eventual completion of the project.

APPLESAUCE

Dear Editor: Will you answer the following question through your columns to settle an argument: How many apples did Adam and Eve eat?

Some say Adam 8 and Eve 2, a total of 10 only. Now we figure the thing out far differently. Eve 8 and Adam 8 also, total 16. And yet the above figures are entirely wrong. If Eve 8 and Adam 82—certainly the total will be 90.

Scientific men, however, on the strength of the theory that the antediluvians were a race of giants, reason something like this: Eve 81, Adam 82, total 163. Wrong again. What could be clearer than if Eve 81 and Adam 812, would not the total be 893? If Eve 811st and Adam 812 would not the total be 1623?

We believe the following to be a fair solution: Eve 814 Adam: Adam 8124 Eve—total 8938. Still another calculation is as follows: If Eve 814 Adam, Adam 8122 oblige Eve—total 8936. We think this, however, not a sufficient quantity, for, though we admit that Eve 814 Adam, Adam if he 8081242 keep Eve company, would make the total 8,082,056.

All wrong. Eve, when she 81812 many, and probably she felt sorry for it, but her companion, in order to relieve her grief, 812. Therefore, when Adam 8181420 pity Eve's depressed spirits. Hence both ate 81,896,864 apples—Irving E. Tier, *Exchange*.

Despite the things all the other women in the world say about her, Mrs. Anne Lindburgh says some right "cute" things herself. When she visited Mr. Hoover at his camp on the Rapidan, she wrote to some of her Smith College friends, as follows:

You girls have always called me slow,
Now beat this if you can—
When a Great Man named his mountain camp,
He called it Rapid Anne!

JANUARY BULLETIN OF SNOW SURVEY AND PRECIPITATION DATA

The Division of Water Resources, State Department of Public Works has prepared a bulletin covering snow survey and precipitation data up to February 1st for this season. This bulletin is being sent to irrigation districts, water companies, public utilities, water users, engineers and many others, and is available for distribution to any to whom the data are of importance or interest.

The snow surveys have been made pursuant to an act and appropriation by the last legislature, empowering and directing the Department to do this work. During the summer and fall last year "snow courses" throughout the Sierra from the Upper Sacramento River basin on the north to Kern River basin on the south, were established and the necessary preparations made in the way of stocking shelter cabins with provisions, bedding, and wood, providing equipment for the surveys, and making the arrangements for the men to do the work. Most of the surveys are made through cooperation with agencies such as the public utilities, irrigation districts, etc., which have men located in the mountains in connection with their regular duties. One hundred and fifty snow course locations have been made and all of these will be surveyed about the first of April to furnish the data upon which estimates of the April-July stream flow may be made. In each major stream basin certain "key" courses have been selected at which snow surveys will be made monthly from January to May. This is done to furnish data for progress reports of snow and precipitation conditions prior to the time of the main survey about April 1st. The bulletin now being sent out gives the results of the surveys at the key courses up to February 1st and furnishes also the data on seasonal precipitation to this date at nearly all stations of the U. S. Weather Bureau, state and private agencies located in the mountainous portions of the stream basins.

Conditions to February 1st.

As most of the snow courses are newly established, no comparison with results of previous years or reference to "normals" can be made. In a few instances, however, the snow surveys have been conducted for many years, and the comparisons in these cases are given. In Tahoe basin, courses at Tahoe City and Marlette Lake show a water content between 30 and 40 per cent of the entire seasonal normal (October to May). In the Yuba basin, courses at Summit and Lake Fordyce show a water content about 35 per cent of the entire seasonal normal and in the Mokelumne basin a crest course at Blue Lakes shows a water content 45 per cent of the entire seasonal normal.

The comparison of conditions to February 1st with normal, using the data from the precipitation stations shows in general that the precipitation in the northern stream basins, Upper Sacramento, Pit, McCloud, Feather and Yuba, ranges from about 20 per cent above to about 15 per cent below normal. In the central basins, American, Mokelumne, Stanislaus, Tuolumne, Merced, and Mono, it varies from about normal to as much as 40 per cent below, and in the southern basins, Upper San Joaquin, Kings, Kaweah, and Kern, it is practically 50 per cent below normal.

Sister: What shall we give father for his birthday present?

Brother: Let's let him drive the car.

State Highway Progress Reports

COLUSA COUNTY

C. R. Merrill of Willows was awarded a contract for widening the roadbed between Colusa and Meridian. The work consists of widening the present narrow, roadbed to a uniform width of 26 feet throughout. The contractor started work on November 12, 1929 and was making very good progress until temporarily closed down on account of rain December 8.

DEL NORTE COUNTY

The Holdener Construction Company have a contract for stockpiling crushed rock screenings over 35 miles of the Redwood Highway between the new Hiouchi Bridge over Smith River and the Oregon line. The contractors have approximately 40 per cent of the work completed.

The contractors have engaged Smith Bros. to complete the work and the crushing plant has just been moved to a new location and they are again producing.

Smith Bros. have a contract for placing corrugated metal pipe subdrains along the state highway between a point approximately 5 miles east of Crescent City and the Hiouchi Bridge over Smith River. The work is practically complete.

EL DORADO COUNTY

Construction of oil-treated rock borders between Folsom and Clarks Corner is completed. The completed project provides a paved traveled way 18 feet wide with superelevated curves. The work was financed from the State Highway maintenance fund budgeted for eighty-first and eighty-second fiscal years. The improvement was made under contract to W. H. Larson of Sacramento and the period of construction was from May to December, 1929.

Between Riverton and Kyburz on Route 11 the grading of 5.75 miles is in progress. As a Forest Highway, this is a cooperative project to which $140,000 was subscribed as the state's share. This contract was awarded to G. E. Finnell and is under the supervision of federal engineers.

Hemstreet & Bell completed work on their contract for surfacing with untreated crushed gravel that portion of the Mother Lode Highway between Logtown and about 4 miles southerly. This work was financed from the State Highway maintenance fund.

Nate Lovelace is working on his contract for grading between Bay View Rest and Eagle Falls. Progress is slow. If weather permits, the contractor will carry on his work through the winter.

MONTEREY COUNTY

The reconstruction of the Coast Highway from Salinas south 10 miles to Chualar by the Peninsula Paving Company is complete. This project covers a 36-foot roadbed with a 20-foot second story asphaltic concrete pavement. The Peninsula Paving Company has made excellent progress in handling this work.

At Spence, 5 miles south of Salinas, Triberti-Massaro, contractors, are constructing abutments for an underpass of the Southern Pacific Railroad. This work is under the supervision of the Bridge Department.

A new bridge across the Salinas River at San Ardo, under supervision of the Bridge Department, is being built by Ben C. Gerwick, contractor. The change of line and approaches to the bridge, 1.5 miles in length, involve grading a 36-foot roadbed and placing a 20-foot Portland cement concrete pavement. Frederickson and Watson and Frederickson Brothers are the contractors.

The plans for a new bridge and a major change of line at the Bradley Crossing of the Salinas River are held in abeyance pending the location of the road northerly from the bridge.

On the San Simeon-Carmel Highway a timber bridge of ten 19-foot spans across Villa Creek is nearing completion. H. C. Whitty is contractor and the work is under the supervision of the Bridge Department.

On the San Simeon-Carmel Highway construction work is in progress with convict labor. Two camps are maintained. At Little Sur a crew of 95 men and two power shovels are working and between Villa Creek and Alder Creek about the same number of men with three power shovels are working. About 7.3 miles of graded roadway has been completed. Surveys for the location of the road are in progress between the two camps.

NEVADA COUNTY

The Callahan Construction Company on December 12 suspended work for the winter on their contract for grading and surfacing between Indian Springs and Soda Springs near the summit of the Colfax-Truckee road.

Grading and surfacing 11.7 miles between Nevada City and Washington Road is being performed under contract awarded to C. B. Adams. This section, consistent with the rest of the Ukiah-Tahoe Highway, will consist of a 24-foot roadbed. An oil-mixed crushed rock surface, 20 feet wide, is to be placed by the terms of the contract. The grading is practically complete and about 60 per cent of untreated surfacing has been placed. On account of weather conditions, it will be impossible to oil-treat the surfacing until warmer weather. Accordingly, this work will not be complete until some time in June.

NEVADA AND PLACER COUNTIES

Between Roseville and one-half mile north of Andora subway, bituminous macadam surfacing and rock borders have been constructed under contract to J. E. Johnston.

T. E. Connolly on January 4, 1930, suspended work for the winter on his grading contract between Air-

port and Indian Springs on Route 37. 9.3 miles of construction is in progress. This project covers the construction of a 28-foot roadbed. Construction will be resumed next year.

ORANGE COUNTY

The contract for a line change 0.7 of a mile in length between Serra and San Juan Capistrano has just been completed. This work consisted of constructing a 40-foot graded roadbed with Portland cement concrete pavement, 20 feet by 7 inches. Matich Bros. were the contractors.

A contract for paving one-half width between Santa Ana and Anaheim was awarded on June 11th to Griffith Company. This section is 4.9 miles long. The paving work was done in cooperation with Orange County, the state paying for a strip of pavement 28 feet by 7 inches and the county paying for a like amount. The state's portion of this highway is completed, and work is nearly completed on the county's portion.

A contract for widening the roadbed between Sunset Beach and Newport the entire width of the 90- to 100-foot right of way, and the placing of an additional 10-foot strip of Portland cement concrete has been awarded to the Macco Construction Co. When this work is completed the pavement will be 30 feet wide for the entire distance. It is expected that this work will be completed by next December.

A small contract for replacing temporary surfacing with Portland cement concrete, 30 feet wide, between Dana Point and Serra is nearly completed. Matich Bros. are the contractors on this work.

SAN BENITO COUNTY

Surveys have been completed and plans are being prepared for the reconstruction of Route 22 from a point 3.2 miles north of Hollister to San Felipe on the Pacheco Pass lateral, a distance of about 5 miles.

SAN DIEGO COUNTY

Work has been completed of constructing oil rock borders on portions of the Coast Route between the city limits of San Diego and Oceanside. The R. E. Hazard Contracting Company of San Diego were the contractors.

A contract for grading the Rose Canyon road between Balboa avenue and Torrey Pines road was awarded on August 13th to the R. E. Hazard Contracting Company. This section is 5.4 miles long and is to be a 46-foot graded roadbed. About 3 miles have been graded to date.

The contract for grading a roadbed 36 feet wide and placing of Portland cement concrete pavement 20 feet by 7 inches is nearly completed between Pine Valley and Kitchen Creek on the San Diego-El Centro Highway. Basich Brothers are the contractors.

A contract for 4.5 miles of 38-foot graded roadbed between La Posta Creek and Miller Creek on the San Diego-El Centro Highway was awarded on May 27th to the Nevada Contracting Company. Good progress is being made on this contract.

A contract for grading 3.9 miles of 36-foot roadbed from Kitchen Creek to La Posta and paving with 20 feet by 7 inches Portland cement concrete was awarded on June 25th to Basich Bros. About 3 miles of rough grading is completed, and grading is now in progress on about one mile. It is expected that paving will start shortly. This section is on the San Diego-El Centro Highway.

SAN LUIS OBISPO COUNTY

On the Coast Highway between Atascadero and Paso Robles, a distance of 9.6 miles, the road is being reconstructed with a 36-foot roadbed and a 20-foot asphaltic concrete pavement. Steel Finley is the contractor.

In the town of Atascadero, M. J. Bevanda, contractor, is constructing street improvements which include full width street work on the highway through the town. This is being handled through a local improvement district.

Bids have been received on the reconstruction of the Coast Highway from the Santa Maria River to Los Berros Creek, a distance of 7.2 miles. This is to be a 36-foot roadbed and a 20-foot Portland cement concrete pavement.

Surveys have been completed on the proposed reconstruction of the Coast Highway between San Luis Obispo and Cuesta Grade.

SANTA BARBARA COUNTY

On the Coast Highway west of Santa Barbara, between Eagle Creek and El Capitan Creek, oil surface on crusher run base rock shoulder, 3 feet wide, are being placed by the Cornwall Construction Company, contractors.

Bids have been received on the reconstruction of the Coast Highway from Wigmore to Zaca, a distance of 4 miles. The roadbed is to be 36 feet wide and the pavement 20-foot Portland cement concrete. This project is located about 4 miles south of Los Alamos.

Plans are complete for the reconstruction of a portion of the Cuyama lateral from the second crossing of the Cuyama River to the Kern County Line, a distance of about 38 miles. A portion of this project is in San Luis Obispo County.

Plans are being prepared for a change of line at Nojoqui Creek on the Coast Highway about 2 miles south of Buellton. This will involve a new bridge over the creek.

HUMBOLDT COUNTY

The work of producing and stockpiling bituminous macadam rock along the Redwood Highway for a 20-foot by 2-inch bituminous macadam pavement between a point 1 mile south of Orick and the northerly Humboldt County line has been taken over by the state for completion. It is intended that this rock shall be stockpiled during the winter season in order that the Heafey-Moore Company who have the contract for placing the bituminous macadam may proceed with the work as soon as weather conditions permit next summer.

The Heafey-Moore Company who have the contract for placing a 20-foot by 2-inch bituminous macadam pavement for the 10.7 miles between Mill Creek and Trinidad have shut down for the winter and expect to resume the work of completing their contract as soon as weather conditions permit next summer.

Mercer-Fraser Company have completed the construction of the overhead crossing of the highway over

the Northwestern Pacific Railroad and the Arcata and Mad River Railroad approximately 1 mile north of Arcata, and this new section of highway from Arcata to Mill Creek, 4 miles in length, has now been opened up to the traveling public.

The E. C. Coats contract for grading and surfacing a 28-foot standard roadway on that portion of the Redwood Highway between Fish Creek Grove and Stephens Grove in the vicinity of Miranda for a distance of 2.9 miles is progressing very satisfactorily considering the handicaps due to the winter conditions. The work is approximately 25 per cent complete.

The Englehart Paving and Construction Company have the contract for producing and placing crushed rock surfacing on approximately 7.3 miles of the Redwood Highway between Dean Creek and Fish Creek, approximately 6 miles south of Miranda. The contractor has his crushing plant set up and has just started placing material on the roadway.

H. H. Boomer Company who have the contract for grading and surfacing that portion of the state highway, approximately 1.2 miles in length from Garberville northerly, is well advanced with his clearing and drainage structure operations and has started some excavation work. The work is approximately 5 per cent complete, but winter weather conditions prohibit normal progress.

INYO COUNTY

From the southerly boundary of Inyo County to Little Lake, a distance of approximately 9.8 miles, Fred W. Nighbert, is the contractor. This project will be completed in May, 1930. B. M. Gallagher is resident engineer.

From Little Lake to Coso Junction, a distance of approximately 3.7 miles Fred W. Nighbert is the contractor. This project will be completed in May, 1930. B. M. Gallagher is resident engineer.

From Coso Junction to Olancha, a distance of approximately 21.3 miles, the Allied Contractors have commenced grading operations. This project is to be completed in September, 1930. S. C. Risley is resident engineer.

Widening of shoulders is under way north of Independence. This work is being done by day labor forces, under the direction of Paul Peak, foreman.

KERN COUNTY

Bids were opened on January 2, 1930, for grading of a standard 36-foot roadbed and placing thereon 20 feet of oil-treated surfacing, from the end of the present improvement at Cinco to 7 miles north of Ricardo, a distance of approximately 16 miles. George Herz and Company of San Bernardino were low bidders.

From 7 miles north of Ricardo to Olancha, there are at this time five contracts under way, all of which provide for the construction of a standard 36-foot graded roadbed, and the placing of an oil-treated surface 20 feet wide. The first of these contracts, extending to Freeman Junction, a distance of approximately 10.2 miles, is under contract to G. W. Ellis, and will be completed early in February, and is under the direction of V. E. Pearson, resident engineer.

From Freeman Junction to the northerly boundary of Kern County, a distance of approximately 13.9 miles, Bartlett & Mathews, Black & Hagey, are the contractors. Work on this contract will probably be finished during the latter part of April, 1930. V. E. Pearson is resident engineer.

LAKE COUNTY

The grading of the Ukiah-Tahoe road between Clear Lake Oaks and Sweet Hollow Summit has been completed by convict labor forces. From the summit to Abbott Mine the 20-foot graded roadbed is being widened to 24 feet.

Von der Hellen, Pierson and Logan have completed their contract for grading and surfacing with untreated crushed gravel or stone between Lucerne and Clear Lake Oaks.

LOS ANGELES COUNTY

The contract for a line change immediately north of the Newhall tunnel has been awarded to McCray Co. Good progress is being made on this work. It is expected that this contract will be completed next June.

The first contract on the La Canada-Mt. Wilson Highway for grading 2.6 miles of 40-foot roadbed was awarded to H. W. Rohl Company on August 14th. Rough grading is in progress on one and one-half miles.

A contract for paving the Newhall alternate with Portland cement concrete, 30 feet wide, has been awarded to Jahn & Bressi. Grading of this section has just been completed by Le Tourneau & Lindberg. The new location is on greatly improved alignment and eliminates Saugus, Newhall and the Newhall tunnel from the Ridge Route. This section is 8.6 miles long.

LOS ANGELES-VENTURA COUNTIES

A contract for oil mix shoulders between Calabasas and Conejo Summit has been awarded to the Southwest Paving Company. It is expected that this contract will be finished in April.

MENDOCINO COUNTY

The contract for placing a 4-inch thickness of crushed gravel surfacing on portions of the Redwood Highway between a point 2 miles south of Arnold and the Sherwood-Laytonville road is progressing very satisfactorily through the contractors, Hemstreet and Bell.

Had not heavy rain storms and snow hampered the work, production would have no doubt been further advanced than at the present time.

MONO COUNTY

Between Mattly Ranch and Leevining, C. S. Miles is the contractor for the construction of 2.2 miles of standard graded roadbed 24 feet wide, with a 20-foot crushed rock base with a three-quarter-inch armor coat surface. On account of winter weather, the placing of the armor coat has been postponed until next June.

The work of remedying blind curves, by widening on the Sherwin Hill, 20 miles north of Bishop is rapidly nearing completion.

Surveys and plans have been completed on proposed improvements between Sonora Junction and Coleville in northern Mono County.

This project traverses the canyon of the west branch of the Walker River, a popular recreational area for nature lovers from Nevada and northern California. A very considerable interest is manifested by the public in this improvement which plays an important part in interstate connections. Besides being the nucleus of extensive improvements to the south in Mono County this project is linked with contracts under way by the Bureau of Public Roads, Coleville to the California state line and on into Nevada. The state of Nevada has been exceedingly active in road improvements through the Carson Valley, via Carson City, Minden, Gardnerville and on to Mono County, California, which, together with the work described in the foregoing is providing ready and pleasurable access from the north to the open spaces "East of the High Sierras."

VENTURA COUNTY

A contract for second story paving with asphaltic concrete from Conejo Creek to Camarillo has been awarded to Griffith Company. It is expected that this work will be completed by next June.

YOLO COUNTY

The construction of Portland cement concrete pavement on line change at Mullen crossing is practically complete. The work is being done under contract by C. W. Wood of Stockton.

The state highway between Bretona and Dunnigan will be improved next season under contract by J. E. Johnston. The work will consist of placing bituminous surface on existing pavement and constructing rock borders.

YUBA COUNTY

Bituminous macadam surfacing and rock borders were constructed on that portion of the state highway between Dry Creek and Morrison's crossing under contract by J. E. Johnston.

GENERAL

Maintenance operations have been confined principally to slide removal, slide prevention and snow removal during the last month. Maintenance crews, however, have been able to keep the roads open for most of the time with but very little delay to the traveling public.

California leads the states in airports with 143. Texas next with 100, according to the Department of Commerce.

In a country newspaper appeared the following advertisement:

"The man who picked up my wallet in Fore street was recognized. He is requested to return it."

The next day this reply was published:

"The recognized man who picked up your wallet requests the loser to call at any time and collect it."

Record of Bids and Awards

HIGHWAY BID OPENINGS AND AWARDS

January 2 to 29, inclusive

IMPERIAL COUNTY—Myers Creek Bridge to 3 miles west of Coyote Wells, grading and paving with Portland cement concrete 2.9 miles. Dist. VIII, Rt. 12, Sec. A. Yglesios Bros., Inc., San Diego, $162,180; V. R. Dennis Const. Co., San Diego, $149,009; George Herz & Co., San Bernardino, $138,127; Watson & Sutton, San Diego, $135,826. Contract awarded to Basich Brothers, Los Angeles, $121,148.90.

IMPERIAL COUNTY—Between El Centro and Holtville, 9 miles to be graded and paved with Portland cement concrete. Dist VIII, Rt. 27, Sec. C. J. F. Knapp, Oakland, $296,254; T. M. Morgan, Los Angeles, $313,456; Basich Bros. Const. Co., Los Angeles, $286,391; Jahn and Bressi Const. Co., Los Angeles, $291,815; Wells and Bressler, Santa Ana, $322,785; Sander Pearson, Santa Monica, $285,506; Watson & Sutton, San Diego, $317,013. Contract awarded to A. M. Peck Co., Los Angeles, $264,955.35.

KERN COUNTY—Between the westerly boundary and Junction Pumping Station, grading and surfacing with bituminous macadam 15.5 miles. Dist. VI, Rt. 33, Sec. A. Hartman Construction Co., Bakersfield, $312,698; J. E. Johnston, Stockton, $281,452; Isbell Construction Co., Fresno, $315,334; V. R. Dennis Construction, San Diego, $311,228; Clyde W. Wood, Stockton, $378,591; Lord & Bishop, Oroville, $327,762; Jack Casson, Hayward, $360,217; Skells & Graham, Roseville, $311,271; M. J. Bevenda, Stockton, $339,168; Gibbons & Reed Co., Burbank, $340,540; Wells & Bressler, Santa Ana, $338,746; C. R. Johnson, Portland, $288,539; A. Teichert & Son, Sacramento, $299,150. Contract awarded to Valley Paving & Construction, Visalia, $264,655.25.

KERN COUNTY—Between San Emigdio Road and Main Valley route, 9.7 miles to be graded and surfaced with oil-treated crushed gravel or stone. Dist. VI, Rt. 57, Sec. C. J. E. Johnston, Stockton, $161,275; A. Teichert and Son, Sacramento, $144,189; S. J. Hales, Santa Ana, $140,134; Tieslau Bros., Berkeley, $127,439; C. R. Johnson, Portland, $131,764; Hartman Construction Co., Bakersfield, $134,127; Isbell Construction, Fresno, $153,964; G. W. Ellis, Los Angeles, $130,943. Contract awarded to V. R. Denis Construction Company, San Diego, $126,455.

LOS ANGELES COUNTY—At Liberty Grade about 5 miles west of Calabasas, 1.2 miles to be graded and paved with Portland cement concrete. Dist. VII, Rt. 2, Sec. C. McCray Company, Los Angeles, $87,335; Jahn and Bressi Construction, Los Angeles, $95,395; Gist & Bell, Arcadia, $85,821; Schelling Co., Burbank, $97,546; The Callahan Construction, Los Angeles, $94,997; Sander Pearon, Santa Maria, $75,725; Gibbons and Reed, Burbank, $92,985; Bruce Bros., Inc., Huntington Beach, $79,909; Basich Brothers Construction, Los Angeles, $73,449. Contract awarded to Will F. Peck Co., Los Angeles, $69,953.45.

LOS ANGELES COUNTY—Between 2½ and 4 miles north of La Canada, 1.5 miles to be graded (heavy excavations). Dist. VII, Rt. 61, Sec. A. Sharp & Fellows Contracting, Los Angeles, $407,868; Geo. Pollock Co., Sacramento, $350,987; W. H.

Hauser, Oakland, $321,519; The Utah Construction Co., San Francisco, $386,478; Gist & Bell, Arcadia, $319,276; M. S. Ross, Los Angeles, $290,653; J. G. Donoyan & Son, Los Angeles, $331,975; Nevada Contracting Co., Fallon, Nevada, $293,266; Jahn & Bressi Construction Co., Los Angeles, $379,746; Macco Construction, Clear Water, $376,840; H. W. Rohl Co., Los Angeles, $275,177. Contract awarded to T. M. Morgan Paving Co., Los Angeles, $272,790.50.

RIVERSIDE COUNTY—At Wineville subway, 0.5 of mile of approaches to be paved with Portland cement concrete. Dist. VIII, Rt. 19, Sec. A. George Herz & Co., San Bernardino, $43,687. Contract awarded to Matich Bros., Elsinore, $42,592.50.

SAN LUIS OBISPO COUNTY—Between Santa Maria River and Los Berros Creek, 7.2 miles to be graded and paved with Portland cement concrete. Dist. V, Rt. 2, Sec. F. McCray Co., Los Angeles, $309,078; Matich Bros., Elsinore, $325,020; T. M. Morgan Paving Co., Los Angeles, $303,692; Sander Pearson, Santa Monica, $325,908; Peninsula Paving Co., San Francisco, $289,732; C. R. Johnson, Portland, $319,431; Basich Bros. Construction, Los Angeles, $292,861; Valley Paving Construction, Visalia, $358,448; C. W. Wood, Stockton, $288,371; A. J. Raisch, San Jose, $312,011; V. R. Dennis Construction, San Diego, $371,205; Corwall Construction, Santa Barbara, $293,599; M. J. Bevanda, Stockton, $317,084; Jahn & Bressi Construction, Los Angeles, $299,791. Contract awarded to J. F. Knapp, Oakland, $272,648.05.

SAN MATEO COUNTY—San Mateo to Redwood City, 7.3 miles grading Bayshore Highway. Dist. IV, Rt. 68, Sec. C. MacDonald & Kahn, San Francisco, $466,338; Gist & Bell, Arcadia, $471,955; Marsh Brothers & Gardinier, Inc., San Francisco, $504,462; H. W. Rohl Co., Los Angeles, $411,194; Standard Dredging Co., Oakland, $466,094; Guy F. Atkinson Co., San Francisco, $514,388; Granfield, Farrar & Carlin, San Francisco, $506,717; C. R. Johnson, Portland, $525,202; George Pollock Co., Sacramento, $466,812; The Utah Construction, San Francisco, $502,138. Contract awarded to Frederickson & Watson and Frederickson Bros., Oakland, $406,145.20.

SANTA BARBARA COUNTY—Between Zaca and Wigmore, 4 miles to be graded and paved with Portland cement concrete. Dist. V, Rt. 2, Sec. C. W. A. Dontanville, Salinas, $184,147; Matich Bros., Elsinore, $189,472; Central Construction Co., Oakland, $220,309; McCray Company, Los Angeles, $172,592; T. M. Morgan Paving Co., Los Angeles, $164,154; Sander Pearson, Santa Monica, $181,929; C. R. Johnson, Portland, $172,664; J. F. Knapp, Oakland, $157,292; M. J. Bevanda, Stockton, $221,090; C. W. Wood, Stockton, $170,659; A. J. Raisch, San Jose, $184,082; Basich Bros. Construction Co., Los Angeles, $165,470. Contract awarded to Cornwall Construction Company, Santa Barbara, $153,239.50.

SANTA CLARA COUNTY—Between San Francisquito Creek and San Antonio Ave., main Coast Route, grading and paving with asphaltic concrete, 4.4 miles. Dist. IV, Rt. 2, Sec. A. C. W. Wood, Stockton, $286,660; N. M. Ball, Porterville, $297,027; Peninsula Paving Co., San Francisco, $280,001; A. J. Raisch, San Jose, $281,764. Contract awarded to Hanrahan Company, San Francisco, $264,926.95.

SISKIYOU COUNTY—Yreka to Klamath River, grading and surfacing with untreated crushed gravel or stone, 7 miles. Dist. II, Rt. 3, Sec. C. Guy F. Atkinson, San Francisco, $583,445; Nevada Contracting Co., Fallon, Nevada, $590,636; T. M. Morgan Paving Co., Gazelle, $613,574; Barsh Bros. and Gardenier, Inc., San Francisco, $600,275; H. E. Doering, Portland, $616,129; C. R. Johnson, Portland, $580,787; The Utah Const. Co., San Francisco, $667,841; Ward Engineering Co., San Francisco, $681,664; Kern & Kibbe, San Francisco, $582,757; A. C. Greenwood, Portland, $619,087. Contract awarded to Wren & Greenough, Portland, $571,626.25.

SOLANO COUNTY—Through Dixon, realignment of main route, eliminating two dangerous grade crossings, grading and paving 0.7 of a mile with Portland cement concrete. Dist. X, Rt. 7, Sec. E. Frederickson and Watson, Oakland, $30,666. Contract awarded to C. W. Wood, Stockton, $27,974.80.

TULARE COUNTY—Between Pixley and Tipton, 8.6 miles to be graded and paved with asphalt concrete. Dist. VI, Rt. 4, Secs. A and B. Valley Paving and Construction, Visalia, $244,175; A Teichert & Son, Inc., Sacramento, $247,054; Hanrahan Company, San Francisco, $285,480. Contract awarded to California Construction Co., San Francisco, $240,109.60.

AWARD OF CONTRACTS
DIVISION OF ARCHITECTURE
January 2 to January 30, 1930

AGNEWS STATE HOSPITAL, for drilling water well, contract awarded to J. Fred Holthouse of Santa Clara; price $8,150.

SAN DIEGO STATE TEACHERS COLLEGE, for general work, training school and power house; awarded to H. Mayson of Long Beach; price $137,645. Another contract for heating, ventilating and plumbing work on the above, awarded to Thomas Haverty Company of Los Angeles; price $20,433. A third contract for electrical work on the above awarded to Moore Electric Company of Los Angeles; price $6,245. Contract for installation of new return tubular boilers, above college, awarded to R. G. Meyler Corporation of Los Angeles; price $10,300.

SAN FRANCISCO STATE TEACHERS COLLEGE, for grading play field areas; awarded to Sibley Grading & Teaming Co., Ltd., San Francisco; price $7,490.

PACIFIC COLONY, for construction of roads in and about grounds, awarded to Pearson & Dickerson of Riverside; price $3,000.

DAM APPROVALS
APPLICATIONS
AND PLANS

Applications for approval of dams built prior to August 14, 1929, filed with the State Department of Public Works, Division of Water Resources, during the month of January, 1930.

LOS ANGELES COUNTY—Dry Canyon Dam No. 6-5. City of Los Angeles, Los Angeles, owner; earthfill, 54½ feet above streambed with a storage capacity of 657 acre-feet. Situated on Dry Canyon Creek in Sec. 35, T. 5 N., R. 16 W., S. B. M., for storage purposes for municipal use. Estimated cost $127,000.

LOS ANGELES COUNTY—Fairmont Dam No. 6-8. City of Los Angeles, Los Angeles, owner; earthfill, 1112 feet above streambed with a storage capacity of 7487 acre-feet. Situated in Sec. 12, T. 7 N., R. 15 W., S. B. M., for storage purposes for municipal use. Estimated cost $627,500.

LOS ANGELES COUNTY—Lower Franklin Dam No. 6-14. City of Los Angeles, Los Angeles, owner; earthfill, 96 feet above streambed with a storage

capacity of 1052 acre-feet. Situated in Sec. 12, T. 1 S., R. 15 W., S. B. M., for storage and diversion purposes for municipal use. Estimated cost $238,136.

LOS ANGELES COUNTY—South Haiwee No. 6-24A. City of Los Angeles, Los Angeles, owner; earthfill, 81 feet above streambed with a storage capacity of 60,000 acre-feet. Situated in Sec. 2, T. 21 S., R. 37 E., M. D. M., for storage purposes for municipal use. Estimated cost $355,000.

LOS ANGELES COUNTY—North Haiwee Dam No. 6-24B. City of Los Angeles, Los Angeles, owner; earthfill, 26 feet above streambed with a storage capacity of 60,000 acre-feet. Situated in Sec. 3, T. 20 S., R. 37 E., M. D. M., for storage purposes for municipal use. Estimated cost $65,800.

LOS ANGELES COUNTY—Upper Franklin Dam No. 6-27. City of Los Angeles, Los Angeles, owner; earthfill, 50 feet above streambed with a storage capacity of 123 acre-feet. Situated in Sec. 36, T. 1 N., R. 15 W., S. B. M., for storage purposes for municipal use. Estimated cost $28,647.

MENDOCINO COUNTY—Albion River No. 381. Albion Lumber Co., Albion, owner; timber and rockfill, 9.5 feet above streambed with a storage capacity of 150 acre-feet.

MODOC COUNTY—Dannhauser Dam No. 161. Webber & Moffit, Alturas, owners; earth, 5½ feet above streambed with a storage capacity of 350 acre-feet. Situated on ditch tributary to Yankee Jim Slough, in Sec. 8, T. 41 N., R. 13 E., M. D. M., for storage purposes for irrigation use.

MODOC COUNTY—Upper Pasture No. 161-2. Webber & Moffit, Alturas, owners; earth, 11 feet above streambed with a storage capacity of 250 acre-feet. Situated on Yankee Jim Slough, in Sec. 3, T. 42 N., R. 13 E., M. D. M., for storage purposes for irrigation use.

LASSEN COUNTY—Fleming No. 241. J. J. Fleming & Co., Wendel, Lassen Co., owners; earth and rock, 10 feet above streambed with a storage capacity of 79.8 acre-feet. Situated on unnamed creek tributary to Ash Creek in Sec. 6, T. 37 N., R. 11 E., M. D. M., for storage purposes for irrigation and domestic use.

SAN BENITO COUNTY—Paicines Reservoir No. 652. San Benito Land & Water Co., Hollister, owner; earth, 20 feet above streambed with a storage capacity of 4500 acre-feet, tributary to San Benito and Tres Pinos creeks for storage purposes for irrigation use.

LOS ANGELES COUNTY—Highland Dam No. 6-12. City of Los Angeles, Los Angeles, owner; earthfill, with a storage capacity of 61.3 acre-feet.

LOS ANGELES COUNTY—Ascot Dam No. 6. City of Los Angeles, Los Angeles, owner; earth, 59 feet above streambed with a storage capacity of 219 acre-feet. Situated in T. 15 N., R. 13 W., S. B. M., for storage purposes for municipal use. Estimated cost $102,497.

LOS ANGELES COUNTY—Pacoima Dam No. 32-8. Los Angeles County Flood Control Dist., Los Angeles, owner; arch, 340 feet, above streambed with a storage capacity of 11,925 acre-feet. Situated on Pacoima Creek tributary to Los Angeles River, in Sec. 19, T. 3 N., R. 14 W., M. D. M., for storage purposes for flood control use. Estimated cost $2,514,770.

SAN MATEO COUNTY—Dumbarton Bridge No. 1 No. 616. Dumbarton Bridge Co., San Francisco, owner; earth, 18 feet above streambed. Situated on Ravenswood Slough, tributary to San Francisco Bay, in Sec. 24, T. 5 S., R. 3 W., M. D. M.

MODOC COUNTY—"G" (Bottle Cr.) No. 145. G. O. Transzettal, Alturas, owner; earth and rock, 8 feet above streambed. Situated in Secs. 27 and 28, T. 45 N., R. 10 E., M. D. M., for storage purposes for irrigation and stock use.

MODOC COUNTY—"C" (Antelope) No. 145-2. G. O. Transzettal, Alturas, owner; earth and rock, 20 feet above streambed. Situated in Sec. 13, T. 44 N., R. 10 E., M. D. M., for storage purposes for stock and irrigation use.

MODOC COUNTY—"M" No. 145-3. G. O. Transzettal, Alturas, owner; earth and rock, 10 feet above streambed. Situated in Sec. 19, T. 44 N., R. 9 E., M. D. M., for storage purposes for domestic and irrigation use.

MODOC COUNTY—"N" No. 145-4. G. O. Transzettal, Alturas, owner; earth and rock, 10 feet above streambed. Situated in Sec. 25, T. 25 N., R. 9 E., M. D. M., for storage purposes for domestic and irrigation use.

MODOC COUNTY—Fairchilds (F) 145-5. G. O. Transzettal, Alturas, owner; earth and rock, 20 feet above streambed. Situated in Sec. 13, T. 43 N., R. 9 E., M. D. M., for storage purposes for domestic and irrigation use.

KERN COUNTY—Lake of the Woods Dam No. 733. J. D. and Florence Cuddy, Lebec, owners. Situated in Sec. 33, T. 9 N., R. 20 W., S. B. M.

LOS ANGELES COUNTY—Ivanhoe No. 6-13. City of Los Angeles, Los Angeles, owner; earth, 26 feet above streambed with a storage capacity of 147.5 acre-feet. Situated in Sec. 8, T. 1 S., R. 13 W., S. B. M., for storage purposes for municipal use.

LOS ANGELES COUNTY—Elysian Dam No. 6-6. City of Los Angeles, Los Angeles, owner; earth fill, 33 feet above streambed with a storage capacity of 32.1 acre-feet. Situated in T. 1 S., R. 13 W., S. B. M., for storage purposes for municipal use.

LOS ANGELES COUNTY—Encino No. 6-7. City of Los Angeles, Los Angeles, owner; earth, 99 feet above streambed with a storage capacity of 3229 acre-feet. Situated on Encino Creek tributary to Los Angeles River in T. 1 N., R. 15 W., S. B. M., for storage purposes for municipal use. Estimated cost $341,075.

LASSEN COUNTY—Spooner Dam No. 241-2. J. J. Fleming & Co., Wendel, owners; earth and rock, 11 feet above streambed with a storage capacity of 3122.8 acre-feet. Situated on Unnamed Canyon tributary to Ash Creek in Sec. 30, T. 37 N., R. 12 E., M. D. M., for storage purposes for domestic and irrigation use.

YUBA COUNTY—Bullards Bar Dam No. 97. Pacific Gas & Electric Co., San Francisco, owner; arch, 175 feet above streambed with a storage capacity of 35,000 acre-feet. Situated on North Fork of Yuba River, tributary to Yuba River, in Sec. 24, T. 18 N., R. 8 E., M. D. M., for storage purposes for power, mining and debris use. Estimated cost $821,900.

NEVADA COUNTY—Blue Lake Dam No. 97-12. Pacific Gas & Electric Co., San Francisco, owner; earth and rock, 19 feet above streambed with a storage capacity of 1123 acre-feet. Situated on branch of Rucker Creek tributary to So. Fork Yuba River in Sec. 9, T. 17 N., R. 12 E., M. D. M., for storage purposes for power use. Estimated cost $6,834.

NEVADA AND PLACER COUNTIES—Drum Afterbay Dam No. 97-19. Pacific Gas & Electric Co., San Francisco, owner; arch, 73 feet above streambed with a storage capacity of 275 acre-feet. Situated on Bear River tributary to Feather River in Sec. 17, T. 16 N., R. 11 E., M. D. M., for regulation purposes for power use. Estimated cost $199,455.

PLACER COUNTY—Drum Forebay Dam No. 97-20. Pacific Gas & Electric Co., San Francisco, owner; earth, 49 feet above streambed with a storage capacity of 444 acre-feet. Situated on Drum Canal in Sec. 16, T. 16 N., R. 11 E., M. D. M., for regulation purposes for power use. Estimated cost $380,219.

NEVADA COUNTY—Fuller Lake Dam No. 97-21. Pacific Gas & Electric Co., San Francisco, owner; earth, 27 feet above streambed with a storage capacity of 1194 acre-feet. Situated on Jordon Creek tributary to South Yuba River in Sec. 17, T. 17 N., R. 12 E., M. D. M., for storage purposes for power use. Estimated cost $8,893.

PLACER COUNTY—Kidd Lake Dam No. 97-25. Pacific Gas & Electric Co., San Francisco, owner; earth, 29.5 feet above streambed with a storage capacity of 1492 acre-feet. Situated on unnamed stream tributary to South Fork Yuba River located in Sec. 29, T. 17 N., R. 14 E., M. D. M., for storage purposes for power use. Estimated cost $49,010.

NEVADA COUNTY—Lake Fordyce Dam No. 97-28. Pacific Gas & Electric Co., San Francisco, owner; rock, 121 feet above streambed with a storage capacity of 46,662 acre-feet. Situated on Fordyce Creek, tributary to So. Fork Yuba River located in Sec. 34, T. 18 N., R. 13 E., M. D. M., for storage purposes for power use. Estimated cost $1,870,390.

NEVADA COUNTY—Lake Spaulding Dam No. 97-29. Pacific Gas & Electric Co., San Francisco, owner; arch, 275 feet above streambed with a storage capacity of 74,488 acre-feet. Situated on South Yuba River tributary to Yuba River located in Sec. 20, T. 17 N., R. 12 E., M. D. M., for storage and diversion purposes for power use. Estimated cost $2,353,676.

NEVADA COUNTY—Lower Feeley L. Dam No. 97-35. Pacific Gas & Electric Co., San Francisco, owner; earth, 10.8 feet above streambed with a storage capacity of 115 acre-feet. Situated on Branch of Fall Creek tributary to South Fork Yuba River in Sec. 29, T. 18 N., R. 12 E., M. D. M., for storage purposes for power use. Estimated cost $1,075.

NEVADA COUNTY—Lower Lindsey Lake Dam No. 97-36. Pacific Gas & Electric Co., San Francisco, owner; earth, 8 feet above streambed with a storage

capacity of 252 acre-feet. Situated on Branch of Texas Creek tributary to South Fork of Yuba River in Sec. 20, T. 18 N., R. 12 E., M. D. M., for storage purposes for power use. Estimated cost $2,193.

NEVADA COUNTY—Lower Rock Lake Dam No. 97-38. Pacific Gas & Electric Co., San Francisco, owner; earth and rock, 3½ feet above streambed with a storage capacity of 31 acre-feet. Situated on Branch of Texas Creek tributary to South Yuba River in Sec. 15, T. 18 N., R. 12 E., M. D. M., for storage purposes for power use. Estimated cost $374.

NEVADA COUNTY—Meadow Lake Dam No. 97-40. Pacific Gas & Electric Co., San Francisco, owner; earthfill, 30 feet above streambed with a storage capacity of 4700 acre-feet. Situated on a stream tributary to Fordyce Creek in Sec. 27, T. 18 N., R. 13 E., M. D. M., for storage purposes, for power use. Estimated cost $110,305.

NEVADA COUNTY—Middle Lindsey Lake Dam No. 97-41. Pacific Gas & Electric Co., San Francisco, owner; earth, 6 feet above streambed with a storage capacity of 138 acre-feet. Situated on Branch of Texas Creek tributary to South Yuba River in Sec. 21, T. 18 N., R. 12 E., M. D. M., for storage purposes for power use. Estimated cost $811.

NEVADA COUNTY—Rucker Lake Dam No. 97-44. Pacific Gas & Electric Co., San Francisco, owner; earth and rock 14½ feet above streambed with a storage capacity of 552 acre-feet. Situated on Rucker Creek, tributary to South Fork Yuba River in Sec. 8, T. 17 N., R. 12 E., M. D. M., for storage purposes for power use. Estimated cost $5,176.

NEVADA COUNTY—Upper Feeley Lake Dam No. 97-45. Pacific Gas & Electric Co., San Francisco, owner; earth, 16 feet above streambed with a storage capacity of 964 acre-feet. Situated on Branch of Fall Creek, tributary to South Fork Yuba River in Sec. 28, T. 18 N., R. 12 E., M. D. M., for storage purposes for power use. Estimated cost $2,606.

NEVADA COUNTY—Upper Lindsey Lake Dam No. 97-46. Pacific Gas & Electric Co., San Francisco, owner; earth, 5.6 feet above streambed with a storage capacity of 20 acre-feet. Situated on Branch of Texas Creek tributary to South Yuba River in Sec. 21, T. 18 N., R. 12 E., M. D. M., for storage purposes for power use. Estimated cost $150.

PLACER COUNTY—Upper Peak Lake Dam No. 97-47. Pacific Gas & Electric Co., San Francisco, owner; earth, 33 feet above streambed with a storage capacity of 1607 acre-feet. Situated on Unnamed Creek tributary to South Fork Yuba River in Sec. 32, T. 17 N., R. 14 E., M. D. M., for storage purposes for power use. Estimated cost $26,536.

NEVADA COUNTY—Upper Rock Lake Dam No. 97-48. Pacific Gas & Electric Co., San Francisco, owner; earth, 13.8 feet above streambed with a storage capacity of 207 acre-feet. Situated on Unnamed Creek tributary to South Fork Yuba River in Sec. 15, T. 18 N., R. 12 E., M. D. M., for storage purposes for power use. Estimated cost $2,224.

NEVADA COUNTY—White Rock Lake Dam No. 97-49. Pacific Gas & Electric Co., San Francisco, owner; earth, 10.5 feet above streambed with a storage capacity of 578 acre-feet. Situated on a Branch of North Creek tributary to Fordyce Creek, in Sec. 22, T. 18 N., R. 14 E., M. D. M., for storage purposes for power use. Estimated cost $11,185.

CONTRA COSTA COUNTY—St. Mary's Dam No. 584. St. Mary's College, Oakland, owner; earth, 35 feet above streambed with a storage capacity of 400 acre-feet. Situated on Las Trompas Creek tributary to Walnut Creek in Sec. 17, T. 1 S., R. 2 W., M. D. M., for storage and diversion purposes for irrigation and recreational use. Estimated cost $100,000.

SAN DIEGO COUNTY—Barrett Dam No. 8. City of San Diego, San Diego, owner; gravity arch, 161 feet above streambed with a storage capacity of 42,899 acre-feet situated on Cottonwood Creek tributary to Tia Juana River in Sec. 22, T 17 S., R. 3 E., S. B. M., for storage purposes for municipal use. Estimated cost $1,650,000.

SAN DIEGO COUNTY—Chollas Dam No. 8-2. City of San Diego, San Diego, owner; earth, 58 feet above streambed with a storage capacity of 278 acre-feet situated on Branch of Chollas Creek tributary to San Diego Bay in Sec. 35, T. 16 S., R. 2 W., S. B. M., for equalizing purposes for municipal use. Estimated cost $131,000.

SAN DIEGO COUNTY—Lake Hodges Dam No. 8-3. City of San Diego, San Diego, owner; multiple arch, 115 feet above streambed with a storage capacity of 65,000 acre-feet. Situated on San Dieguito River tributary to Pacific Ocean in Sec. 18, T. 13 S., R. 2 W., S. B. M., for storage purposes for municipal use. Estimated cost $500,000.

SAN DIEGO COUNTY—Lower Otay Dam No. 8-4. City of San Diego, San Diego, owner; gravity arch, 137.5 feet above streambed with a storage capacity of 49,126 acre-feet. Situated on Otay River tributary to San Diego Bay in Secs. 18 and 13, T. 18 S., R. 1 E., and 1 W., S. B. M., for storage purposes for municipal use. Estimated cost $744,828.

SAN DIEGO COUNTY—San Dieguito Dam No. 8-6. City of San Diego, San Diego, owner; multiple arch, 50 feet above streambed with a storage capacity of 1128 acre-feet. Situated on Branch of Escondido Creek tributary to Pacific Ocean, for equalizing purposes for municipal use. Estimated cost $50,000.

SAN DIEGO COUNTY—Upper Otay No. 8-8. City of San Diego, San Diego, owner; arch, 72 feet above streambed with a storage capacity of 2793 acre-feet, situated on Proctor Valley Creek tributary to Otay River in Sec. 36, T. 17 S., R. 1 W., S. B. M., for storage purposes for municipal use. Estimated cost $80,000.

LOS ANGELES COUNTY—Bellevue Dam No. 6-3. City of Los Angeles, Los Angeles, owner; earth, 44 feet above streambed with a storage capacity of 106.8 acre-feet situated in Sec. 18, T. 1 S., R. 13 W., S. B. M., for storage purposes for municipal use. Estimated cost $77,135.69.

LOS ANGELES COUNTY—Buena Vista Dam No. 6-2. City of Los Angeles, Los Angeles, owner; earth, 21,5 feet above streambed with a storage capacity of 40 acre-feet situated in T. 1 S., R. 13 W., S. B. M., for municipal use.

LOS ANGELES COUNTY—Rowena Dam No. 6-18. City of Los Angeles, Los Angeles, owner; earth, 15 feet above streambed with a storage capacity of 94.22 acre-feet situated in Sec 5, T. 1 S., R. 13 W., S. B. M., for storage purposes for municipal use. Estimated cost $57,549.70.

LASSEN COUNTY—Goodrich Diversion Dam No. 237-2. Red River Lumber Co., Westwood, owner; earth, 6 feet above streambed with a storage capacity of 60 acre-feet situated on Hamilton Branch tributary to Feather River, in Sec. 35, T. 29 N., R. 9 E., M. D. M., for diversion purposes for irrigation and industrial use. Estimated cost $11,000.

LASSEN COUNTY—Westwood Mill Pond No. 237-3. Red River Lumber Co., Westwood, owner; earth, 13.5 feet above streambed with a storage capacity of 488 acre-feet situated on Robbers Creek tributary to Feather River in Sec. 8, T. 28 N., R. 9 E., M. D. M., for storage purposes for logging use. Estimated cost $35,000.

LASSEN COUNTY—Piute Creek Dam No. 237-4. Red River Lumber Co., Westwood, owner; earth, 48 feet above streambed with a storage capacity of 126 acre-feet situated on Piute Creek tributary to Susan River in Sec. 27, T. 30 N., R. 11 E., M. D. M. Estimated cost $10,000.

MODOC COUNTY—Plum Canyon Dam No. 139. Mrs. Lester H. Porter and John Page, Alturas, owners; earth, 14 feet above streambed with a storage capacity of 125 acre-feet situated on Plum Canyon tributary to Parker Creek in Sec. 32, T. 42 N., R. 13 E., M. D. M., for storage purposes for irrigation and stock use. Estimated cost $600.

EL DORADO COUNTY—Patterson Dam No. 466. C. A. Patterson, Placerville, owner; earth and rock, 9 feet above streambed with a storage capacity of 10 acre-feet for storage purposes for irrigation use.

BUTTE COUNTY—Philbrook Dam No. 97-8. Pacific Gas & Electric Co., San Francisco, owner; earth, 65 feet above streambed with a storage capacity of 4875 acre-feet situated on Philbrook Creek tributary to West Branch of North Fork of Feather River in Sec. 13, T. 25 N., R. 4 E., M. D. M., for storage purposes for power use. Estimated cost $266,240.

PLACER COUNTY—Christian Valley Dam No. 97-15. Pacific Gas & Electric Co., San Francisco, owner; rock, 28 feet above streambed with a storage capacity of 110 acre-feet situated on South Fork of Dry Creek tributary to Feather River in Sec. 26, T. 13 N., R. 8 E., M. D. M., for regulation purposes for power use. Estimated cost $57,325.

PLACER COUNTY—Halsey Forebay No. 97-23. Pacific Gas & Electric Co., San Francisco, owner; earth, 20 feet above streambed with a storage capacity of 285 acre-feet situated on unnamed water course tributary to Dry Creek in Sec. 13, T. 13 N., R. 8 E., M. D. M., for regulation purposes for power use. Estimated cost $168,860.

PLACER COUNTY—Rock Creek Dam No. 97-43. Pacific Gas & Electric Co., San Francisco, owner; multiple arch, 30 feet above streambed with a storage capacity of 550 acre-feet situated on Rock Creek tributary to Feather River in Sec. 28, T. 13 N., R. 8 E., M. D. M., for regulation purposes for power use. Estimated cost $144,750.

ALPINE COUNTY—Lower Blue Lake No. 97-62. Pacific Gas & Electric Co., San Francisco, owner; earth, 43.3 feet above streambed with a storage capacity of 4130 acre-feet situated on Blue Creek tributary to North Fork Mokelumne River in Sec. 30, T. 9 N., R. 19 E., M. D. M., for storage purposes for power use. Estimated cost $127,137.

ALPINE COUNTY—Meadow Lake No. 97-63. Pacific Gas & Electric Co., San Francisco, owner; rock, 69.5 feet above streambed with a storage capacity of 6110 acre-feet situated on Unnamed Stream tributary to North Fork Mokelumne River in Sec. 27, T. 9 N., R. 18 E., M. D. M., for storage purposes for power use. Estimated cost $172,413.

ALPINE COUNTY—Twin Lakes No. 97-69. Pacific Gas & Electric Co., San Francisco, owner; earth, 17.3 feet above streambed with a storage capacity of 1425 acre-feet situated on Unnamed Stream tributary to North Fork Mokelumne River in Sec. 25, T. 9 N., R. 18 E., M. D. M., for storage purposes for power use. Estimated cost $20,171.

ALPINE COUNTY—Upper Blue Lake Dam No. 97-70. Pacific Gas & Electric Co., San Francisco, owner; earth, 26.6 feet above streambed with a storage capacity of 7200 acre-feet situated on Blue Creek tributary to North Fork Mokelumne River in Sec. 18, T. 9 N., R. 19 E., M. D. M., for storage purposes for power use. Estimated cost $41,124.

TUOLUMNE COUNTY—Herring Creek No. 97-71. Pacific Gas & Electric Co., San Fracisco, owner; crib, 12 feet above streambed with a storage capacity of 100 acre-feet situated on Herring Creek tributary to South Fork Stanislaus River in Sec. 30, T. 5 N., R. 19 E., M. D. M., for storage purposes for power use. Estimated cost $5,886.

SHASTA COUNTY—Pit No. 3 (Lake Britton) Dam No. 97-98. Pacific Gas & Electric Co., San Francisco, owner; gravity, 102 feet above streambed with a storage capacity of 32,200 acre-feet situated on Pit River tributary to Sacramento River in Sec. 30, T. 37 N., R. 3 E., M. D. M., for storage purposes for power use. Estimated cost $1,450,905.

SHASTA COUNTY—Pit No. 1, Diversion Dam No. 97-99. Pacific Gas & Electric Co., San Francisco, owner; concrete, 2 feet above streambed situated on Fall River tributary to Pit River, in Sec. 25, T. 37 N., R. 4 E., M. D. M., for diversion purposes for power use. Estimated cost $140,091.

SHASTA COUNTY—Pit No. 4, Dam 97-100. Pacific Gas & Electric Co., San Francisco, owner; gravity, 43 feet above streambed with a storage capacity of 2000 acre-feet situated on Pit River tributary to Sacramento River, in Sec. 3, T. 36 N., R. 2 E., M. D. M., for diversion purposes for power use. Estimated cost $1,283,117.

MONO COUNTY—Forebay Dam No. 536-2. Mono Mining Co., Wellington, Nevada, owner; crib, 40 feet above streambed with a storage capacity of 35 acre-feet situated on Green Creek tributary to East Walker River in Sec. 4, T. 3 N., R. 25 E., M. D. M., for storage purposes for power use. Estimated cost $18,287.

MONO COUNTY—East Lake Dam No. 536. Mono Mining Co., Wellington, Nevada, owner; rock crib, 15 feet above streambed with a storage capacity of 1087.3 acre-feet situated on Green Creek tributary to E. Walker River in Sec. 26, T. 3 N., R. 24 E., M. D. M., for storage purposes for power use. Estimated cost $4,046.

MONO COUNTY—Green Lake Dam No. 536-3. Mono Mining Co., Wellington, Nevada, owner; crib, 12 feet above streambed with a storage capacity of 400.58 acre-feet situated on Green Creek, tributary to East Walker River in Sec. 22, T. 3 N., R. 24 E., M. D. M., for storage purposes for power use. Estimated cost $1,974.

ORANGE COUNTY—Yorba Dam No. 791. Anaheim Union Water Co., Anaheim, owner; earth, 50 feet above streambed with a storage capacity of 2000 acre-feet, situated in Sec. 27, T. 3 S., R. 9 W., S. B. M., for storage purposes for irrigation use. Estimated cost $53,188.38.

MENDOCINO COUNTY—Morris Dam No. 92. Willits Water Co., Willits, owner; arch, 52.5 feet above streambed with a storage capacity of 835 acre-feet, situated on Jones Creek tributary to Eel River in Sec. 33, T. 17 N., R. 13 W., M. D. M., for storage purposes for domestic use. Estimated cost $65,500.

LOS ANGELES COUNTY—Sierra Madre Dam No. 32-13. Los Angeles Co. Flood Control Dist., Los Angeles, owner; arch 65 feet above streambed with a storage capacity of 63.5 acre-feet. Situated on Little Santa Anita Creek tributary to Santa Anita Creek, in Sec. 16, T. 1 N., R. 11 W., S. B. M., for storage purposes for municipal use. Estimated cost $70,000.

MODOC COUNTY—Roberts No. 1 Dam No. 157. H. M. Roberts, Lookout, owner; earth, 2 feet above streambed with a storage capacity of 933 acre-feet. Situated on Antelope drainage tributary to Pit River in Sec. 29, T. 40 N., R. 7 E., M. D. M., for storage purposes for irrigation use. Estimated cost $2,000.

MODOC COUNTY—Old Roberts Dam No. 157-2. H. M. Roberts, Lookout, owner; earth, 3 feet above streambed with a storage capacity of 3970 acre-feet. Tributary to Pit River in Sec. 11, T. 39 N., R. 7 E., M. D. M., for storage purposes for irrigation use. Estimated cost $4,000.

INYO COUNTY—Hillside Dam No. 100. Hillside Water Co., Riverside, owner; rock, 77 feet above streambed with a storage capacity of 14,000 acre-feet. Situated on South Fork of Bishop Creek tributary to Owens River in Sec. 15, T. 9 S., R. 31 E., M. D. M., for storage purposes for power and irrigation use. Estimated cost $325,595.

INYO COUNTY—Reservoir No. 1 Sabrina Dam No. 101. Nevada-California Power Co., Riverside, owner; rock, 70 feet above streambed with a storage capacity of 7500 acre-feet. Situated on Middle Fork Bishop Creek tributary to Owens River in Sec. 31, T. 8 S., R. 31 E., M. D. M., for storage purposes for power and irrigation use. Estimated cost $257,219.

INYO COUNTY—Bishop Cr. Intake No. 2 No. 101-2. Nevada-California Power Co., Riverside, owner; earth, 29 feet above streambed with a storage capacity of 115 acre-feet. Situated on Middle Fork of Bishop Creek tributary to Owens River in Sec. 16, T. 8 S., R. 31 E., M. D. M., for regulation purposes for power use. Estimated cost $62,174.

INYO COUNTY—Bishop Cr. Intake No. 3 No. 101-3. Nevada-California Power Co., Riverside, owner; concrete, 16 feet above streambed with a storage capacity of 2.3 acre-feet. Situated on Bishop Creek tributary to Owens River in Sec. 9, T. 8 S., R. 31 E., M. D. M., for diversion purposes for power use. Estimated cost $39,564.

INYO COUNTY—Bishop Cr. Intake No. 4 No. 101-4. Nevada-California Power Co., Riverside, owner; concrete, 23 feet above streambed with a storage capacity of 14½ acre-feet. Situated on Bishop Creek tributary to Owens River in Sec. 36, T. 7 S., R. 31 E., M. D. M., for diversion purposes for power use. Estimated cost $51,840.

MONO COUNTY—Rush Creek Meadows Dam No. 101-5. Nevada-California Power Co., Riverside, owner; arch, 47 feet above streambed with a storage capacity of 4970 acre-feet. Situated on Rush creek tributary to Mono Lake in Sec. 14 T. 2 S., R. 25 E., M. D. M., for storage purposes for power and irrigation use. Estimated cost $188,967.

MONO COUNTY—Lundy Lake Dam No. 101-6. Nevada-California Power Co., Riverside, owner; earth and rock, 40 feet above streambed with a storage capacity of 3820 acre-feet. Situated on Mill Creek tributary to Mono Lake in Sec. 16, T. 2 N., R. 25 E., M. D. M., for storage and diversion purposes for power and irrigation use. Estimated cost $178,266.

MONO COUNTY—Bishop Creek Intake No. 5 No. 102. Southern Sierras Power Co., Riverside, owner; concrete, 19 feet above streambed with a storage capacity of 4 acre-feet. Situated on Bishop Creek tributary to Owens River in Sec. 19, T. 7 S., R. 32 E., M. D. M., for diversion purposes for power use. Estimated cost $21,734.

MONO COUNTY—Gem Lake Dam No. 103. Cain Irrigation District, Riverside, owner; multiple arch, 72 feet above streambed with a storage capacity of 17,604 acre-feet. Situated on Rush Creek tributary to Mono Lake in Sec. 30, T. 2 S., R. 26 E., M. D. M., for storage purposes for power use. Estimated cost $795,941.

MONO COUNTY—Agnew Lake Dam No. 103-2. Cain Irrigation Dist., Riverside, owner; multiple arch, 27 feet above streambed with a storage capacity of 851 acre-feet. Situated on Rush Creek tributary to Mono Lake in Sec. 20, T. 2 S., R. 26 E., M. D. M., for storage purposes for power use. Estimated cost $30,400.

MONO COUNTY—Grant Lake Dam No. 103-3. Cain Irrigation District, Riverside; rock, 20 feet above streambed with a storage capacity of 10,111 acre-feet. Situated on Rush Creek tributary to Mono Lake in Sec. 16, T. 1 S., R. 26 E., M. D. M., for storage purposes for irrigation use. Estimated cost $64,726.

MONO COUNTY—Saddlebag Dam No. 103-4. Cain Irrigation Dist., Riverside, owner; rock, 30 feet above streambed with a storage capacity of 11,138 acre-feet. Situated on Leevining Creek tributary to Mono Lake in Sec. 12, T. 1 N., R. 24 E., M. D. M., for storage pur-

poses for irrigation and power use. Estimated cost $257,117.

MONO COUNTY—Tioga Lake Dam No. 103-5. Cain Irrigation Dist., Riverside, owner; rock, 11 feet above streambed with a storage capacity of 1386 acre-feet. Situated on Leevining Creek tributary to Mono Lake in Sec. 19, T. 1 N., R. 25 E., M. D. M., for storage purposes for irrigation and power use. Estimated cost $51,092.

MONO COUNTY—Rhinedollar Lake Dam No. 103-6. Cain Irrigation Dist., Riverside, owner; rock, 12 feet above streambed with a storage capacity of 745 acre-feet. Situated on Leevining Creek tributary to Mono Lake in Sec. 20, T. 1 N., R. 25 E., M. D. M., for storage purposes for irrigation and power use. Estimated cost $176,125.

LASSEN COUNTY—Buckhorn Dam No. 238. First Nat'l. Bank of Reno, Reno, Nevada, owner. Located in Sec. 32, T. 35 N., R. 17 E.

LASSEN COUNTY—Caribau Lake No. 234. J. A. Bennett, Chico, owner; earth, 12 feet above streambed. Situated on Caribau Lake tributary to Susan River in Sec. 34, T. 31 N., R. 7 E., M. D. M., for storage purposes for irrigation use. Estimated cost $1,000.

Applications for approval of plans and specifications for construction or enlargement of dams filed with the State Department of Public Works, Division of Water Resources, during the month of January, 1930.

EL DORADO COUNTY—Rock Creek Dam No. 465. Arthur E. Rasor, Georgetown, owner; earth, 30 feet above streambed with a storage capacity of 34.2 acre-feet. Situated on Rock Creek tributary to South Fork American River in Sec. 34, T. 13 N., R. 11 E., M. D. M., for storage and diversion purposes for domestic, irrigation, mining and recreational use. Estimated cost $2,000.

Applications for approval of plans and specifications for repair or alteration of dams filed with the State Department of Public Works, Division of Water Resources, during the month of January, 1930.

LOS ANGELES COUNTY—Chatsworth Dam No. 6-4A. City of Los Angeles, Los Angeles, owner; earth-fill. Situated on Chatsworth Foothills tributary to Los Angeles River.

LASSEN COUNTY—Spooner Dam No. 241-2. J. J. Fleming & Co., Wendel, owner; earth and rock. Situated on Unnamed Canyon tributary to Ash Creek in Sec. 30, T. 37 N., R. 12 E., M. D. M.

Plans and specifications for the construction or enlargement of dams approved by the State Department of Public Works, Division of Water Resources, during the month of January, 1930.

LOS ANGELES COUNTY—Hansen Dam No. 32-6. Los Angeles Co. Flood Control District, Los Angeles, owner; arch, 180 feet above streambed with a storage capacity of 6250 acre-feet. Situated on Big Tujunga Creek tributary to Los Angeles River in Sec. 1, T. 2 N., R. 13 W., S. B. M., for flood control purposes for municipal use.

MODOC COUNTY—Pickering Pond Dam No. 144. Pickering Lumber Co., Alturas, owner; earth, 22 feet above streambed with a storage capacity of 500 acre-feet. Situated in Sec. 16, T. 42 N., R. 12 E., M. D. M., for storage purposes for logging use. Estimated cost $22,194.29.

MENDOCINO COUNTY—Ridgewood Dam No. 382. Charles S. Howard Co., San Francisco, owner; earth, 34 feet above streambed with a storage capacity of 334 acre-feet. Situated on Forsyth Creek tributary to Russian River in Sec. 18, T. 17 N., R. 13 W., M. D. M., for storage purposes for irrigation use. Estimated cost $25,188.25.

SAN DIEGO COUNTY—Crouch Dam No. 839. Charles S. Crouch, San Diego, owner; earth, 40 feet above streambed with a storage capacity of 40.7 acre-feet. Situated on Unnamed Canyon tributary to Las Chollas Creek in Sec. 3, T. 17 S., R. 2 W., S. B. M., for storage purposes for domestic use. Estimated cost $9,631.

MERCED COUNTY—Merced Falls Dam No. 95-10. San Joaquin Light & Power Co., Fresno, owner; gravity, 34 feet above streambed with a storage capacity of 620 acre-feet. Situated on Merced River tributary to San Joaquin River in Sec. 4, T. 6 S., R. 15 E., M. D. M., for diversion purposes for power and logging use. Estimated cost of enlargement $50,000.

Plans for the repair or alteration of dams approved by the State Department of Public Works, Division of Water Resources, during the month of January, 1930.

LOS ANGELES COUNTY—Chatsworth Dam No. 6-4A. City of Los Angeles, Los Angeles, owner. Earth blanket.

BUTTE COUNTY—Concow Dam No. 67. Thermalito Irrigation District and Table Mountain Irrigation District, Oroville, owner; arch. Situated on Concow Creek tributary to W. Branch Feather River in Sec. 16, T. 22 N., R. 4 E., M. D. M. Nature of repairs—lining area below spillway. Estimated cost $3,000.

LASSEN COUNTY—Spooner Dam No. 241-2. J. J. Fleming & Co., Wendel, owner; earth and rock, situated on Unnamed Canyon tributary to Ash Creek in Sec. 30, T. 37 N., R. 12 E., M. D. M. Nature of alterations—new spillway.

WATER APPLICATIONS AND PERMITS

Applications for Permit to Appropriate Water Filed with the State Department of Public Works, Division of Water Resources, during January, 1930.

VENTURA COUNTY—Application No. 6521. George D. Hantgin, Peter K. Hantzis and Edward Rudolph Schroff, c/o Sheridan, Orr, Drapeau & Gardner, Attys., First National Bank Bldg., Ventura, Cal., for 1 c.f.s. from unnamed spring tributary to San Buenaventura River. To be diverted in Sec. 26, T. 5 N., R. 23 W., S. B. M. for irrigation and domestic purposes. Estimated cost $2,500.

SAN JOAQUIN COUNTY—Application 6522. Linden Irrigation District, c/o A. L. Cowell, Bank of America Bldg., Stockton, Cal., for 100,000 acre-feet per annum from Calaveras River tributary to San Joaquin River. To be diverted in Sec. 5, T. 2 N., R. 9 E., M. D. M., for irrigation and domestic purposes.

LASSEN COUNTY—Application 6523. Antone Avilla, Bieber, Cal., for 4200 acre-feet per annum from Juniper River tributary to Pit River. To be diverted in Sec. 3, T. 36 N., R. 8 E., M. D. M., for irrigation purposes. Estimated cost $10,000.

HUMBOLDT COUNTY—Application 6524. F. A. Leach and Fred D. Smith, Fortuna, Cal., for 0.54 c.f.s. from Eel River tributary to Pacific Ocean. To be diverted in Sec. 24, T. 1 N., R. 1 E., H. M. for irrigation purposes. Estimated cost $200.

RIVERSIDE COUNTY—Application 6525. F. Wm. Seggie, Star Route, Riverside, Cal., for 7100 g.p.d. from Butterfly Canyon Spring (underground water also to be developed) tributary to San Jacinto River. To be diverted in Sec. 31, T. 3 S., R. 1 W., S. B. M., for domestic and irrigation purposes. Estimated cost $200.

SAN JOAQUIN COUNTY—Application 6526. Millard C. and Charles A. Johnson, Rt. 1, Box 162, Escalon, San Joaquin Co., Cal., for 2 c.f.s. from Lone Tree Creek tributary to San Joaquin River. To be diverted in Sec. 21, T. 1 S., R. 8 E., M. D. M., for agricultural purposes. Estimated cost $2,000.

SUTTER COUNTY—Application 6527. T. J. Cummins Ranch Co., c/o Lucius R. Bates, Box 148, Sacramento, Cal., for 5.98 c.f.s. from Sacramento

River tributary to Suisun Bay. To be diverted in Sec. 21, T 12 N., R. 1 E., M. D. M., for irrigation purposes. Estimated cost $7,000.

MONO COUNTY—Application 6528. Newton M. Otis, 200 Juniper Bldg., Santa Monica, Cal., for 300 g.p.d. from unnamed spring tributary to Mammoth Creek and Owens River. To be diverted in Sec. 9, T. 4 S., R. 27 E., M. D. M., for domestic purposes. Estimated cost $75.

PLACER COUNTY—Application 6529. Nevada Irrigation District, c/o Wm. Durbrow, Mgr., Grass Valley, Cal., for 10 c.f.s. from Auburn Ravine. To be diverted in Sec. 13, T. 12 N., R. 6 E., M. D. M.

SAN JOAQUIN COUNTY—Application 6530. Smith-Riddell Company, Inc., Lodi, Cal., for 11.8 c.f.s. from Upland Canal tributary to Sycamore Slough. To be diverted in Sec. 10, T. 3 N., R. 5. E., M. D. M. Estimated cost $13,500.

HUMBOLDT COUNTY—Application 6531. Edgar Lee Wight, 435 Buchanan St., San Francisco, Cal., for 2 c.f.s. from Cinder Cap Spring tributary to Buluff Creek. To be diverted in Sec. 12, T. 10 N., R. 4 E., H. M., for power purposes. Estimated cost $1,500.

INYO COUNTY—Application 6532. H. W. White, Independence, Cal., for 1 g.p.m. from unnamed spring. To be diverted in Sec. 10, T. 13 S., R. 34 E., M. D. M., for mining and domestic purposes. Estimated cost $10.

SUTTER COUNTY—Application 6533. A. M. Donahoe by A. H. Lydon, Mgr. and Agent, c/o Lawrence Schilling, Yuba City, Cal., for 1 c.f.s. from Feather River tributary to Sacramento River. To be diverted in Sec. 14, T. 14 N., R. 3 E., M. D. M., for irrigation purposes. Estimated cost $2,500.

SIERRA COUNTY—Application 6534. Washoe County Water Conservation Dist., c/o King & Malone, Engineers and Contractors, for 50,000 acre-feet per annum from Little Truckee River tributary to Truckee River. To be diverted in Sec. 4, T. 18 N., R. 17 E., M. D. M., for irrigation and domestic purposes.

LAKE COUNTY—Application 6535. Martin Judge, Jr., and Company, Crocker First National Bank, San Francisco, Cal., for 175,000 acre-feet per annum from North Fork of Cache Creek tributary to Cache Creek. To be diverted in Sec. 4, T. 14 N., R. 6 W., M. D. M., for irrigation purposes. Estimated cost $1,000,000.

LAKE COUNTY—Application 6536. Martin Judge, Jr., and Company, Crocker First National Bank, San Francisco, Cal., for 175,000 acre-feet per annum from North Fork Cache Creek tributary to Cache Creek. To be diverted in Sec. 4, T. 14 N., R. 6 W., M. D. M., for industrial and domestic purposes. Estimated cost $3,000,000.

MONO COUNTY—Application 6537. U. S. Inyo National Forest, Dept. of Agriculture, San Francisco, Cal., for 1000 g.p.d. from creek between Lake Mamie and Twin Lakes tributary to Mammoth Creek and Owens River. To be diverted in Sec. 9, T. 4 S., R. 27 E., M. D. M., for domestic purposes. Estimated cost $152.

MONO COUNTY—Application 6538. U. S. Inyo National Forest, Dept. of Agriculture, San Francisco, Cal., for 8200 g.p.d. from Coldwater Creek tributary to Mammoth Creek and Owens River. To be diverted in Sec. 16, T. 4 S., R. 27 E., M. D. M., for domestic purposes. Estimated cost $460.

SAN JOAQUIN COUNTY—Application 6539. H. R. Russell, 426 Hackberry St., Modesto Cal., for 3 c.f.s. from drainage through natural depression and drainage of waste ditch of Oakdale Irrigation District tributary to Little John Creek. To be diverted in Sec. 17, T. 1 S., R. 9 E., M. D. M., for irrigation purposes.

PLACER COUNTY—Application 6540. Mrs. Eva Harness and R. Langley, Loomis, Cal., for 0.26 c.f.s. from Secret Ravine tributary to Antelope Creek. To be diverted in Sec. 10, T. 11 N., R. 7 E., M. D. M. Estimated cost $850.

TUOLUMNE COUNTY—Application 6541. Joseph Brown, Chinese Camp, Cal., for 0.025 c.f.s. from Smarts Gulch tributary to Woods Creek and Tuolumne River. To be diverted in Sec. 18, T. 1 S., R. 15 E., M. D. M. Estimated cost $555.

PLACER AND NEVADA COUNTIES—Application 6542. Bear River Water and Power Co., c/o J. L. Rollins, Colfax, Cal., for 110,020 acre-feet per annum from Bear River and its tributaries tributary to Feather River. To be diverted in Sec. 22, T. 15 N., R. 9 E., M. D. M., for power purposes. Estimated cost $2,500,000.

YUBA COUNTY—Application 6543. Wallace James-Sanford, c/o Rich & Weis, Attys., Hart Bldg., Marysville, Cal., for 1 c.f.s. from Dry Creek tributary to Bear River. To be diverted in Sec. 34, T. 15 N., R. 6 E., M. D. M., for irrigation and stock watering purposes. Estimated cost $3,500.

MENDOCINO COUNTY—Application 6544. Robert B. Finn, c/o Thos. W. Firby, 827 Mills Bldg., San Francisco, Cal., for 0.025 c.f.s. from unnamed creek tributary to Eel River. To be diverted in Sec. 21, T. 19 N., R. 12 W., M. D. M., for domestic purposes. Estimated cost $450.

TUOLUMNE AND ALPINE COUNTIES—Application 6545. Emma Rose and Hobart Estates Co., operating as Utica Mining Co., c/o A. C. Wilson, 1508 Balfour Bldg., San Francisco, Cal., for 10,800 acre-feet per annum from Highland Creek tributary to N. Fork of Stanislaus River. To be diverted in Sec. 9, T. 6 N., R. 18 E., M. D. M., for power purposes.

YOLO COUNTY—Application 6546. Karl Brehme, 1202 Hobart Bldg., San Francisco, Cal., for 200 c.f.s. and 200,000 acre-feet per annum from Putah-Pope-Capell-Eticuera creeks tributary to Sacramento River. To be diverted in Sec. 25, T. 8 N., R. 2 W., M. D. M.

Permits to Appropriate Water, Issued by the Department of Public Works, Division of Water Resources, during January, 1930.

SAN DIEGO COUNTY—Permit 3421, Application 6255. Issued to Palomar Estates, Ltd., Long Beach, Cal., January 8, 1930, for 1.25 c.f.s. from Nigger Creek in Sec. 11, T. 10 S., R. 1 W., S. B. M., for domestic use. Estimated cost $10,000.

SAN DIEGO COUNTY—Permit 3422, Application 6256. Issued to Palomar Estates, Ltd., Long Beach, January 8, 1930, for 3.62 c.f.s. from Pauma Creek in Sec. 3, T. 10 S., R. 1 W., S. B. M., for irrigation use on 917.5 acres. Estimated cost $115,000.

SISKIYOU COUNTY—Permit 3423, Application 6427. Issued to Frank L. Cunningham, Happy Camp, Cal., January 9, 1930, for 3 c.f.s. from Oak Flat Creek in Sec. 32, T. 16 N., R. 7 E., H. M., for power purposes. Estimated cost $5,000.

SIERRA COUNTY—Permit 3424, Application 6342. Issued to Marie E. Phelan, Sierra City, January 10, 1930, for 3 c.f.s. from Slug Canyon in Sec. 2, T. 19 N., R. 10 E., M. D. M., for mining use. Estimated cost $1,000.

VENTURA COUNTY—Permit 3425, Application 6452. Issued to Reginaldo Ruiz, Ojai, Cal., January 13, 1930, for 300 gallons per day from Two Unnamed

Springs in Secs. 6 and 7, T. 6 N., R. 23 W., S. B. M., for domestic use. Estimated cost $1,000.

LOS ANGELES COUNTY—Permit 3426, Application 6375. Issued to H. H. Townsend, Beverly Hills, Cal., January 14, 1930, for 0.001 c.f.s. from Upright Spring in Sec. 19, T. 6 N., R. 17 W., S. B. M., for irrigation use on 60 acres.

EL DORADO COUNTY—Permit 3427, Application 6244. Issued to H. L. Fowlar, Georgetown, Cal., January 17, 1930, for 3 c.f.s. from Little Otter Creek in Sec. 27, T. 13 N., R. 11 E., M. D. M., for mining use. Estimated cost $1,000.

INYO COUNTY—Permit 3428, Application 6466. Issued to American Potash and Chemical Corp., Trona, Cal., January 17, 1930, for 0.0544 c.f.s. from Christmas Spring in Sec. 26, T. 24 S., R. 42 E., M. D. M., for industrial and domestic use. Estimated cost $4,840.

DEL NORTE COUNTY—Permit 3429, Application 6126. Issued to Aller Placer Mines Takilma, Oregon, January 22, 1930, for 3 c.f.s. from East Fork of East Fork, Illinois River, in Sec. 34, T. 19 N., R. 5 E., H. M., for placer mining. Estimated cost $6,000.

SISKIYOU COUNTY—Permit 3430, Application 6292. Issued to Lomgrey Mining & Milling Company, Gottville, Cal., January 22, 1930, for 0.75 c.f.s. from Lumgrey Creek in Sec. 22, T. 47 N., R. 8 W., M. D. M., for mining and domestic purposes. Estimated cost $500.

MENDOCINO COUNTY—Permit 3431, Application 6464. Issued to Thomas S. Van Vleet, Turlock, Cal., January 25, 1930, for 0.45 c.f.s. from West Branch Russian River, in Sec. 32, T. 17 N., R. 12 W., M. D. M., for use for irrigation on 36.44 acres. Estimated cost $1,000.

SAN JOAQUIN COUNTY—Permit 3432, Application 6379. Issued to Charley Jensen, Manteca, Cal., January 25, 1930, for 3.49 c.f.s. from unnamed channel in Sec. 6, T. 1 S., R. 9 E., M. D. M., for irrigation use on 279.3 acres. Estimated cost $4,000.

HUMBOLDT COUNTY—Permit 3433, Application 6172. Issued to Trinity Loop Mining Co., San Francisco, Cal., January 27, 1930, for 20 c.f.s. from Cedar Creek in Sec. 9, T. 6 N., R. 6 E., H. M., for mining use. Estimated cost $3,000.

TRINITY COUNTY—Permit 3434, Application 6192. Issued to Trinity Loop Mining Co., San Francisco, Cal., January 27, 1930, for 10 c.f.s. from Hawkins Creek, in Sec. 9, T. 6 N., R. 6 E., H. M., for mining use. Estimated cost $10,000.

HUMBOLDT COUNTY—Permit 3435, Application 6208. Issued to Trinity Loop Mining Co., San Francisco, Cal., January 27, 1930, for 10 c.f.s. from Grove Prairie Creek in Sec. 9, T. 6 N., R. 6 E., H. M., for mining use. Estimated cost $10,000.

HUMBOLDT COUNTY—Permit 3436, Application 6326. Issued to Trinity Loop Mining Co., San Francisco, Cal., January 27, 1930, for 15 c.f.s. from Horse Range Creek in Sec. 9, T. 6 N., R. 6 E., H. M., for mining use. Estimated cost $8,000.

Policeman—Judge, this man is arrested for gambling and being drunk and driving a car while soused.

Drunk—Your Honor, "Man's inhumanity to man makes countless thousands mourn." I'm not as debased as Swift, as profligate as Byron, as dissipated as Poe, or as debauched as—

Judge—That will do. Thirty days; and officer, take a list of those names and run them in; they're as bad as he is.

Snow Removal Service Commended

WESTWOOD AUTO CLUB

Westwood, California

February 6, 1930.

Mr. H. S. Comly, District Engineer,
State Division of Highways,
Redding, California.

Dear Mr. Comly:

It is with a feeling of pride, for the admirable engineering ability and energy that has been displayed in our district of the California Highway System, on the Snow Removal Program, that this letter is written.

We particularly refer to the Red Bluff-Susanville Highway. This highway has been kept open in such a manner as to make it possible to pass other cars at practically all points at all times with the least inconvenience and to maintain a speed that was very nearly summer schedule. This has been done consistently throughout all storm periods this winter and has afforded the people of northern California, Nevada and states further east to continue an uninterrupted exchange of traffic throughout this period and no doubt the majority of this travel has been towards the milder climate of California.

We appreciate fully that the clearing of this highway has been done with engineering precision, as to the proper and sufficient and adequate equipment, manned by men who could and did labor under the most trying and adverse conditions and happy to say it worked perfectly. Your Maintenance Engineer, Mr. E. J. Gribble is due credit for carrying your plans and program to a successful conclusion. This work has not been done without costs but we believe that the amount expended is commensurate with the good it has done and feel safe in saying that it has been a good investment for California and a great boon to the people.

The members of the Westwood Auto Club feel very grateful for your interest in this problem that has afforded them so much relief and pleasure through the long winter months that heretofore we have been denied motor travel.

With kindest personal regards to you from the club.

WESTWOOD AUTO CLUB,
(Signed) H. GARFIELD OATES.

Suburban Schoolmam: "Rastus, get a bucket of water."

Rastus: "I ain't agwine to do it."

Suburban Schoolmam: "Now, Rastus, you know that is not the way to say anything. Repeat this after me—

"I am not going to do it,
"Thou are not going to do it.
"He is not going to do it.
"We are not going to do it.
"You are not going to do it.
"They are not going to do it.
"Now, Rastus, what would you say?"

Rastus: "They ain't nobody agwine to do it."

Most of the funny columns have already called attention to the difference the lambs in Wall street have found between gamboling and gambling.

STATE OF CALIFORNIA

Department of Public Works

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Port of San Jose—Not appointed
Port of San Diego—Edgar A. Luce

STATE HIGHWAYS IN CALIFORNIA SHOWING THE PRIMARY AND SECONDARY ROAD SYSTEMS AND THE DIVISION OF THE STATE UNDER THE BREED BILL.

CALIFORNIA STATE PRINTING OFFICE
SACRAMENTO, 1930

74097 2-30 7300